VOL. 174 NO. 6

AMERICAN

JUNE, 1951

Gas Journal

JUL 10 1951

Your Best Investment in Measurement

STYLED AND BUILT TO STAY NEW—TO SAVE MONEY IN SERVICE

Rockwell domestic meters are style-lined for today and tomorrow. Compact dimensions conserve space, ease handling. Inner working mechanisms reflect the finest thinking in modern engineering design. And the exclusive bowl type body with its removable and replaceable valve plate assembly saves money in service. No other meters offer you so much value and convenience. Write for catalog.

ROCKWELL MANUFACTURING COMPANY
PITTSBURGH 8, PA.

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Kansas City Los Angeles New York Pittsburgh
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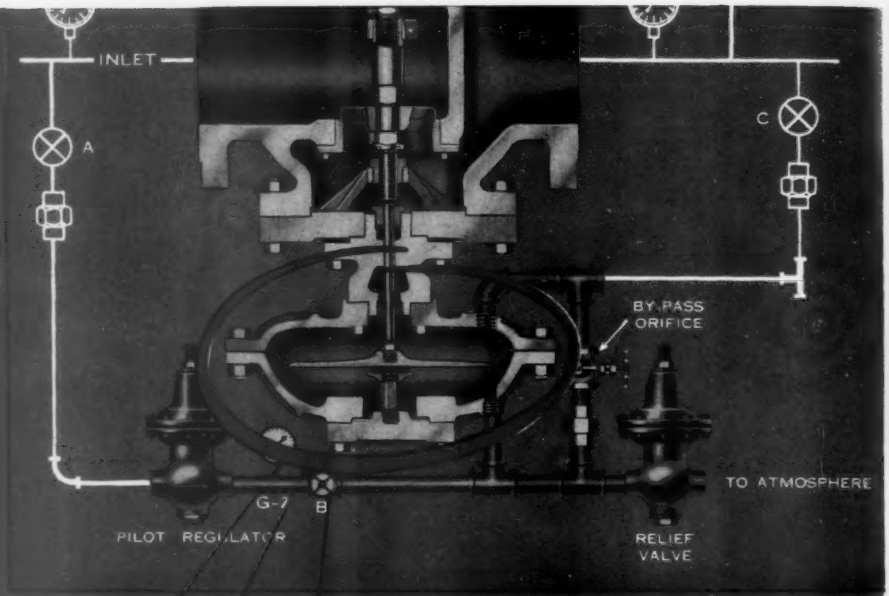
ROCKWELL EMCO DOMESTIC GAS METERS



Uninterrupted Service

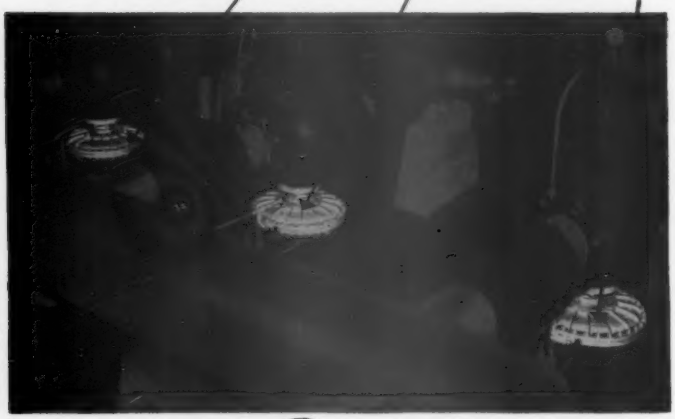
with a

CHAPLIN-FULTON *Sensitrol* *

The Chaplin-Fulton *Sensitrol* is an auxiliary pilot loading system for gas pressure regulators. For new installations it is furnished with a pressure regulator of the correct size and type. In present installations it can easily be applied *without any change in construction.*

The Sensitrol is simple in construction and operation. No intricate parts—no complicated adjustments.

A uniform outlet can be maintained regardless of adverse conditions.



- ***Accurate Regulation***
- ***Rugged But Sensitive***
- ***Low Line Pressure Possible***
- ***Increased Capacity***
- ***Wide Range of Reduced Pressure***
- ***No Atmospheric Bleed***
- ***Regulator Not Overweighted***

INSTALL *Sensitrol* TO PRESENT REGULATOR

It is a simple matter. Remove the bottom cap and bolt the Sensitrol adaptor to the bottom of the regulator. Full instructions for connecting pilot lines at inlet and outlet of main regulators are given in Catalog 150.

ACCURATE CF MFG CO DEPENDABLE

S-51-1

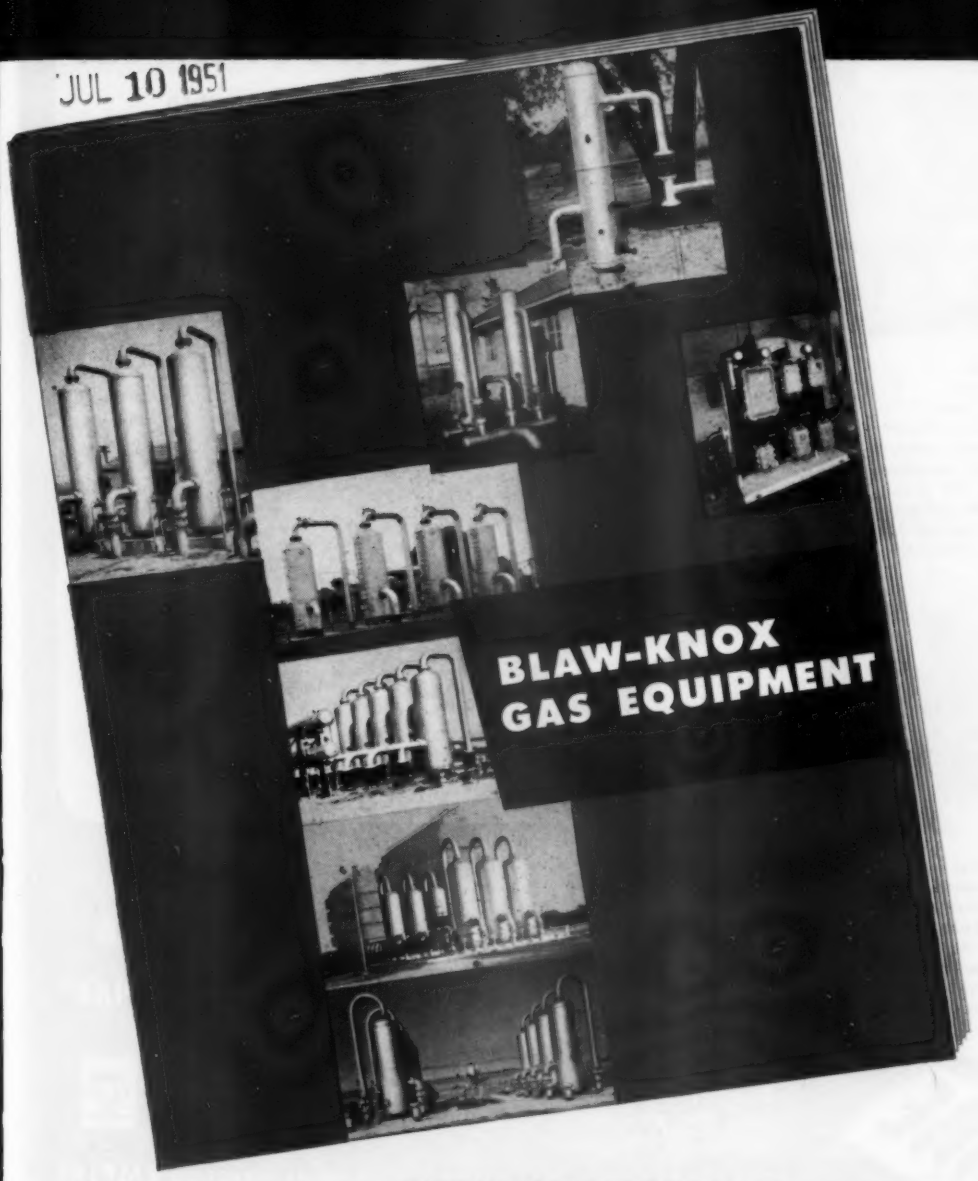
Chaplin-Fulton
MANUFACTURING COMPANY
Pittsburgh 25, Pennsylvania

* Write for Catalog 150

YOURS—for the asking

...this NEW book on gas conditioning

JUL 10 1951



HERE is the story of Blaw-Knox Gas Cleaners and Oil Foggers. Complete with operating data, technical details, capacities and dimensions, Blaw-Knox Bulletin 2353 belongs on every gas man's desk. Send for your copy today!

GAS EQUIPMENT DEPARTMENT **BLAW-KNOX DIVISION** OF BLAW-KNOX COMPANY, PITTSBURGH, PA.

BLAW-KNOX

GAS CONDITIONING EQUIPMENT
COMPLETE GAS CONDITIONING PLANTS

INSTALL EMPIRE
AND
HAVE SATISFIED CUSTOMERS

WITH

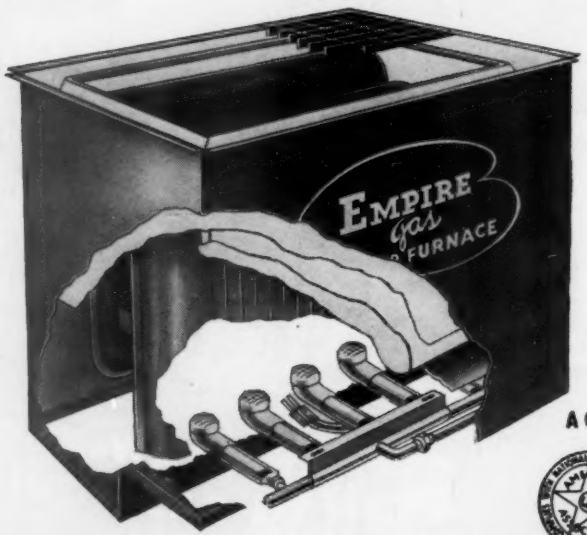
EMPIRE GAS FLOOR FURNACES

- EASY TO INSTALL
- ECONOMICAL TO OPERATE
- LOW FIRST COSTS
- NO BASEMENT NEEDED
- NO AIR DUCTS REQUIRED
- NO EXPENSIVE EXCAVATIONS

Mr. Cleon Lee, C. & L. Market
Logan, Utah
Says:—We are very thrilled with the clean efficient heat our Empire Floor Furnace gives us. We have become the envy of a great many of our grocery customers.

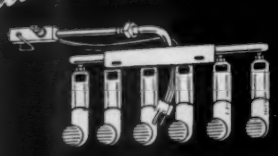
Mr. Tyman Jackson,
Twin City Motor Court
New Brighton, Minnesota
Says:—We have 30 Empire Floor Furnaces installed in our cabins and, outside of the very economical cost of operation, the most satisfying feature is the almost total lack of service required to keep them operating efficiently.

Mr. John W. Mosteller
Cherryville, North Carolina
Says:—The Empire Floor Furnace installed in my house has been in continuous service during the heating months and doing a wonderful, quick, clean, noiseless job at an amazingly low cost.



AGA APPROVED

THE FAMED "Thriftmatic" Gas BURNER "EXCLUSIVE WITH EMPIRE"



Developed to burn gas, the only fully automatic fuel, the new Empire Gas Burner will burn Natural, Mixed, or L-P gases.

SEE YOUR LOCAL EMPIRE REPRESENTATIVE OR WRITE DIRECT TO EMPIRE

EMPIRE STOVE COMPANY
BELLEVILLE, ILLINOIS
WORLD'S LARGEST MANUFACTURER OF Gas FLOOR FURNACES

AMERICAN GAS JOURNAL, June, 1951. Vol. 174, No. 6. Published monthly by American Gas Journal, at 73 Main Street, Brattleboro, Vt. Executive and Editorial offices at 205 East 42nd Street, New York 17, N. Y. Subscription prices: United States $3.00 per year; Canada $4.00; foreign $10.00; single copies 50 cents. Entered as second class matter January 24, 1950, at post office at Brattleboro, Vermont, under Act of March 3, 1879. Printed in U.S.A.

AMERICAN Gas Journal
ESTABLISHED 1859

VOLUME 174 JUNE 1951 NUMBER 6

This month...

We cotton to a gas company that is close enough to its community to understand and use the common touch in dealing with its customers. The United Natural Gas Company in Oil City, Pennsylvania, falls in that classification in our book. Recently 49 home economics seniors from as many high schools within its area were taken on an all day gas country tour of the gas producing areas in Clarion and Jefferson counties. The kids all got to know each other; they learned what makes the natural gas business tick; and what is most important, they had a good lunch and dinner. We often wonder, after all, if the best public relations do not stem from the heart, rather than from the teeming brain of a press agent.

• • •

This issue winds up 92 years of uninterrupted publication of AMERICAN GAS JOURNAL. We attribute our longevity to the fact that we get plenty of fresh air, eat any kind of food that is set in front of us, and never go out of our way to avoid an argument.

• • •

Signori Umberto Caimi and Ferruccio Calvelli, engineers from Stabilimenti Siry Chamon Milano, Italy, paid us a call in recent weeks. We noted with some embarrassment their interest in the gas library that the JOURNAL has been accumulating for the past 92 years; made us fell that we should get around to reading more of the books ourselves.

• • •

With this comment we are closing the books on observations from readers on our February editorial, "Keep Gas Ranges Gas." Al Humm, who rates respect since he has been allied to the gas industry for at least 25 years that we know of, observes: "Should we close our eyes to progress." Progress presumably meaning electrical ignition on a gas range. We say, no, we should not; but let us at least keep our eyes open also to enlightened self interest. In that vein we recommend the reading of C. S. Hazel's story (page 23) "Flash Tube Ignition Has Advantages to Keep Gas Ranges Gas."

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Howard F. Weeks · Associate Editor

Charles R. Bellamy · Technical Editor

Arthur Rohman · Western Editor **John F. Falvey · Financial Editor**

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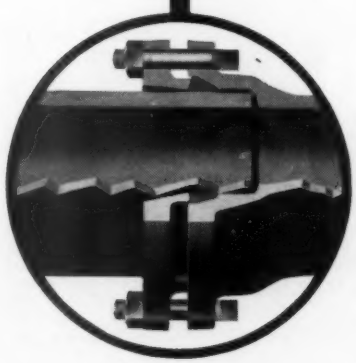
Many important gas utilities have *standardized on standardized mechanical joint cast iron pipe* for new mains carrying all types of gas at low, intermediate and high pressures.

CAST IRON

Cast Iron Pipe Research Association, T. F. Wolfe, Managing Director, Peoples Gas Bldg., Chicago 3.

Economy in laying costs, plus the solid virtues of cast iron as a gas main material, account for the phenomenal success of standardized mechanical joint cast iron pipe in gas service. Ask any construction engineer who has installed it.

Mechanical joint cast iron pipe has a proved record of long life and

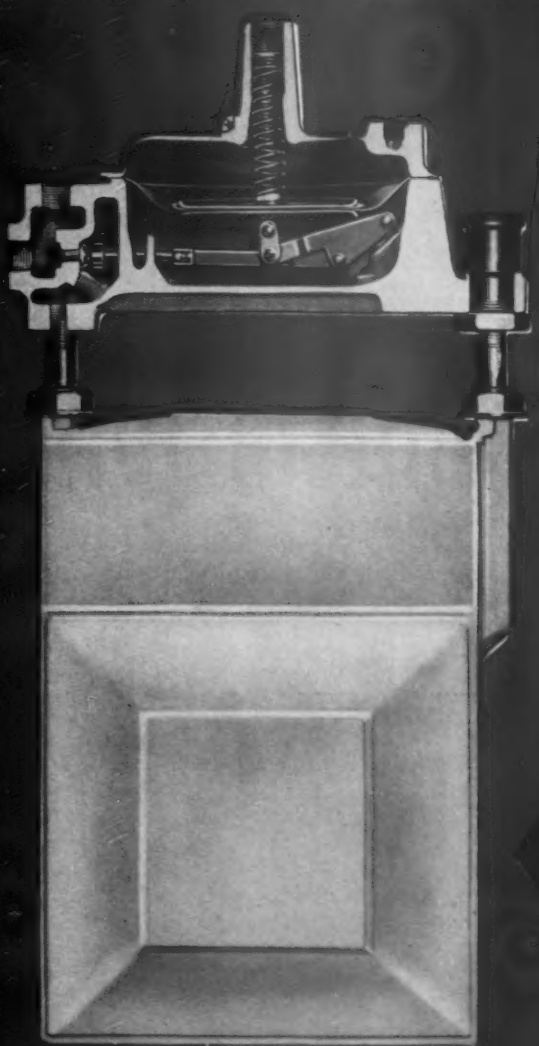


standardized mechanical joint

CAST IRON PIPE

bottle-tight joints. It costs less to lay. More footage can be laid per day with less equipment—with less delays in wet weather—and with less trouble with wet trenches. Standardized and interchangeable accessories and fittings are a much appreciated feature. All these advantages have been conclusively demonstrated in the construction of distribution mains for all types of gas at low, intermediate and high pressures, in all parts of the nation.

MH METER BAR REGULATOR



1 SAVES LABOR

2 SAVES CAPITAL INVESTMENT

3 SAVES FITTINGS

4 SAVES FITTERS' TIME

5 SAVES SERVICE COSTS

Cast in one piece and assembled as a single unit, the MH METER BAR REGULATOR saves up to six fittings, cuts piping to a minimum and reduces possibilities of leaks, because fewer fittings are required.

These outstanding advantages are combined with excellent regulating characteristics, giving unsurpassed fuel line control.

MH METER BAR REGULATOR

an **AMERICAN METER COMPANY** *first*

One of many American Meter Products that maintain the century-old tradition of "sustained accuracy at lower cost."

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AMERICAN METER CO. ENGINEERS

AMERICAN METER COMPANY
Incorporated (Established 1836)

Bryant Model 304 Gas Forced-Air Vertical Furnace. 6 sizes, inputs from 45,000 to 145,000 Btu per hour, approved by A.G.A. for all gases. Features Bryant *Herigage* 12-gauge steel heat exchanger and Bryant *Push-Button* Ignition (city gases only).

Squeeze-easer

FOR TODAY'S HOUSING

Bryant Gas Forced-Air Vertical Furnaces are helping to solve today's important home construction space problem. They're the long-lived space-savers that can be installed almost anywhere . . . in basement, utility room or small closet. They require only slightly more than two square feet of floor space in their smaller sizes.

They provide the kind of fully-automatic, trouble-free operation that pays off in economy and user satisfaction. The proof is in *thousands* of installations in single-family dwellings and in *thousands* of family units of multi-family housing which have Bryant *Personalized Heating*.

Recommend these slim, efficient Bryant Gas Forced-Air Vertical Furnaces to help *your* customers *ease the squeeze*. Get full details from the Bryant Distributor nearest you or write direct: Bryant Heater Division, Dept. 275, Affiliated Gas Equipment, Inc., 17825 St. Clair Avenue, Cleveland 10, Ohio.

Let the pup be furnace man . . . and water boy too!

bryant

AUTOMATIC HEATING

Your *single* source of supply for everything in gas heating equipment!

AT CHITWOOD...

BROAD GAS CONSERVATION with multi-service GMV's

Line-up of four Cooper-Bessemer 8-cylinder GMV compressors, rated 880 hp at 300 rpm, in Magnolia Petroleum Company's Chitwood Gasoline Plant. Here, multi-service operation involves 4800 psi discharge in cycling, 1,015 psi in gasoline extraction, 250 psi for vapor recovery. Flexibility is a keynote.

Another Example of Efficient Power at Lower Cost

GMV's in Magnolia Chitwood plant, shown here from crankdoor side.

Exterior view of compressor building at Magnolia's Chitwood plant.

AT THE Chitwood plant, Magnolia Petroleum Company is doing an outstanding job of gas conservation . . . perhaps unique. The operation includes production of distillate by cycling . . . production of gasoline from casinghead gas . . . vapor recovery off of crude at atmospheric pressure . . . and a pressure maintenance operation.

The operation is of particular interest because it involves both high and low pressures, together with the vapor recovery service — all tied into the same compressor units.

As shown opposite and below, the compressors are efficient Cooper-Bessemer GMV Turboflows — chosen partly because they assure the true flexibility so essential in a multi-service operation such as this.

Whether your plans call for complex compressor service or the most simple kind of set-up, you'll be ahead with Cooper-Bessemer V-Angles. Then you'll be sure of economical installation, prolonged, low-cost performance, and the *flexibility* to meet fixed or variable requirements precisely. Better check with Cooper-Bessemer.

The **Cooper-Bessemer** *Corporation*

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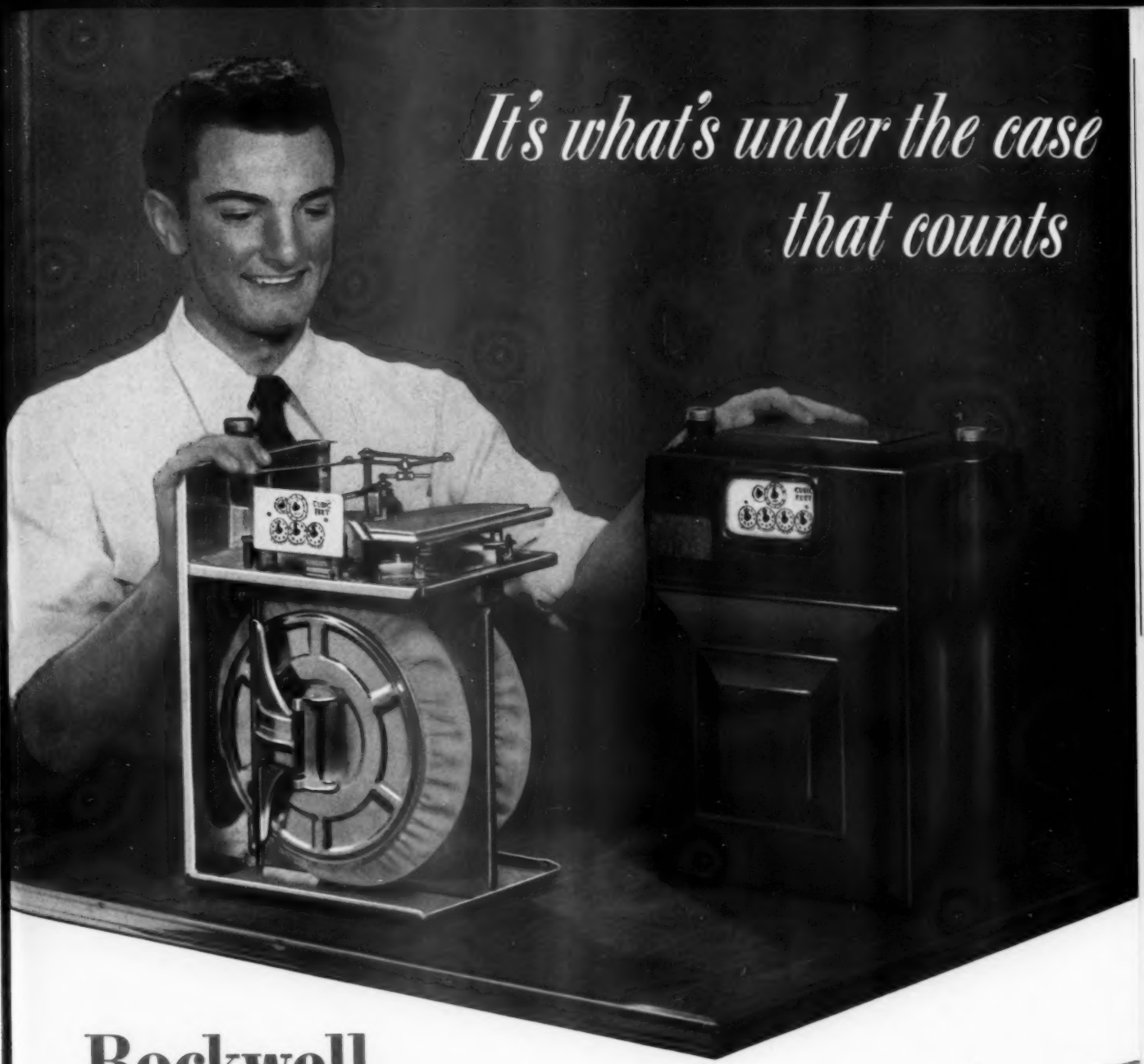
St. Louis, Mo. Los Angeles, Calif. Chicago, Illinois Caracas, Venezuela



Rockwell

SHOWS THE WAY

TO IMPROVED METER PERFORMANCE

All tin meters look pretty much alike—on the outside. It's what's *under* the case that counts. Rockwell tin meters have a host of inner advantages. Consider the important matter of meter capacity. Larger ports and channels are provided in all sizes to boost the safe maximum capacity and reduce pressure loss. Consider, too, the thicker sections of flag wires, flags, and tangents that give increased rigidity—the cranks that are chrome plated for greater wearability—the carefully sewn, wound, treated and aged diaphragms.

Meter cases, themselves, boast many improvements. They are precoated with zinc chromate as a rust inhibitor. Flanges are heavier to guard against leaks. Ample room for full diaphragm movement is provided.

All this adds up to better meter performance with longer life. Get facts about Rockwell tin meters now. Write for bulletin 1020.

Used Coast-to-Coast by America's Leading Utilities

Rockwell

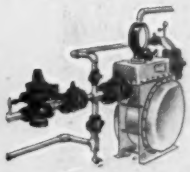
EMCO

TIN GAS METERS

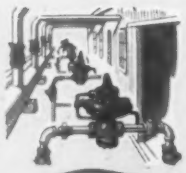
MADE IN BOTH 5 LT. AND 10 LT. MODELS
CAPACITY RANGE FROM 150 CFH to 500 CFH

ROCKWELL

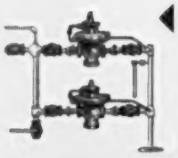
A thousand and one uses IN THE GAS INDUSTRY



LARGE METER SETTING. Where measurement is made at high or intermediate levels "1001" regulators improve meter accuracy by maintaining constant inlet pressure.



COMPRESSOR STATIONS. The "1001" regulator is widely used to provide a constant pressure on the carburetor or mixing valve in gas engine service.

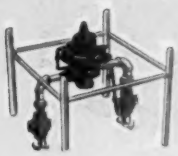


LARGE APPLIANCES. The compact dimensions and extreme sensitivity of "1001" regulators particularly lend themselves to the operation of large heat treating equipment.

INDUSTRIAL BURNERS. The outlet pressure stability of "1001" regulators particularly benefits the operation of high pressure burners or units requiring a fine degree of temperature control.

DISTRICT PRESSURE CONTROL. These regulators are frequently specified as district controls for systems operating on intermediate pressures or in combination with low pressures.

TOWN BORDER STATIONS. Where town border demands do not exceed the capacity of a 2 in. pipe, the Rockwell "1001" regulator has no equal for adaptability and economy.



SMALL DISTRIBUTION SYSTEMS. Everything a distribution man wants has been wrapped up in this small, simple all-purpose design that frequently out-performs larger more specialized types of regulators.

EVERY DAY I FIND NEW WAYS TO SAVE WITH ROCKWELL "1001" REGULATORS

THE HANDIEST REGULATOR IN THE DISTRIBUTION SUPERINTENDENT'S STOCK

This dependable regulator has literally a thousand and one uses. Every day gas men find new applications. Pilot loaded diaphragm provides closest degree of control accuracy. Durably constructed. Economically priced. Wise distribution men now keep several in stock for emergencies. Write for bulletin 1059.

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Meters *Regulators*

TIN ALUMINUM CAST IRON PRESSED STEEL APPLIANCE SERVICE "1001" BALANCED VALVE

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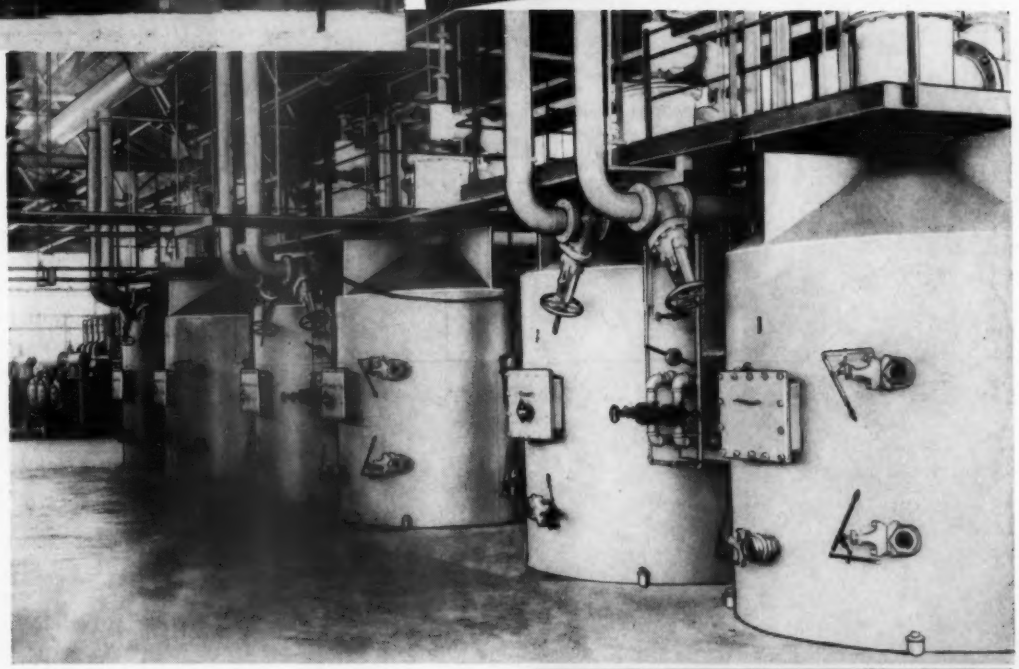
Dayton-Faber Gas Process

HIGH - MEDIUM - LOW B.T.U. GAS
BY OIL GAS - GAS REFORMING
BY PARTIAL COMBUSTION WITH AIR OR AN AIR-OXYGEN MIXTURE
OIL GAS ENRICHED WITH PROPANE

SARNIA PLANT
Main Building
Scrubber Oil Tanks
Precipitator Bldg.
and Boiler House



SARNIA PLANT
Six Reformed Gas Generators.
Total capacity
9 million c.f. per day

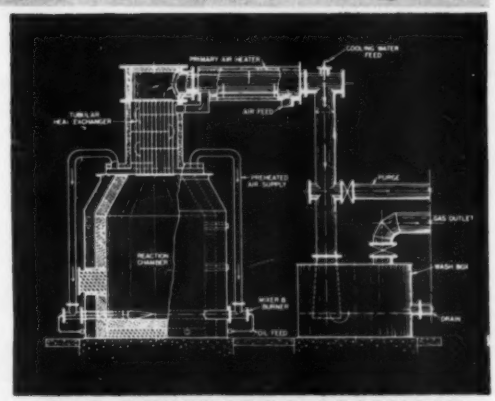
Maximum flexibility because the same plant will produce Oil Gas or will reform Natural Gas, Refinery Still gas or Liquid gases and can be placed in operation in one hour's time from a cold start. Minimum labor requirements.

Of special value as a stand-by plant, peak load plant or for peak load shaving.

In the installation pictured, refinery cracking still gas is reformed to an output of 1000 B.T.U. gas and mixed with natural gas for service to the consumers.

This plant, located at Sarnia, Ontario, enabled Union Gas Company of Canada Limited to furnish gas service to 70,000 consumers during several years of natural gas deficiency. The plant has been in operation since 1942.

At Windsor, Ontario, Canada, the same company maintains a Dayton-Faber oil gas plant which operated during the winter months of the same period with the use of Propane for enrichment to meet peak load requirements.



GAS GENERATOR ASSEMBLY

JOHN INGLIS CO. LIMITED
Engineers • Manufacturers
TORONTO • CANADA
DISTRICT OFFICES: MONTREAL, WINNIPEG, CALGARY, VANCOUVER

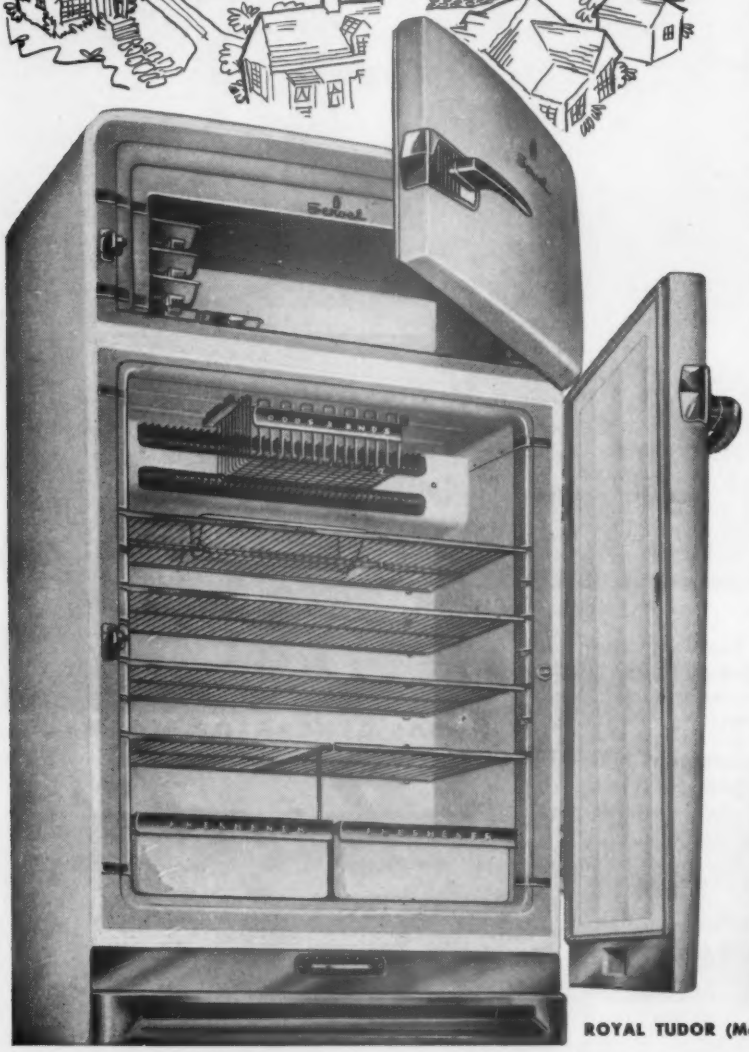
Inglis
CANADA

Now, every kitchen in town is your market with the new SERVEL

WHOLE new sales horizons are opened up with the marvelous new Servel. It was designed to make anybody who uses a kitchen your prospective customer. This dynamic refrigerator is head and shoulders above its closest competition. Engineering changes have made it much larger inside, yet smaller outside. And there are *eight* strikingly handsome models to choose from—one for any size home or family.

Sovereign of the new Servel line is the incomparable Royal Tudor with a huge 11.5-cu. ft. volume. It's really two refrigerators in one —a separate 2-cu.-ft. freezer compartment plus a 9½-cu.-ft. space for other foods. This magnificent Servel has just about every luxurious convenience homemakers could ask . . . feather-touch Bulldog Latches that click shut by themselves...twin glass-covered Dew-Action Vegetable Fresheners...Quick-Change Shelves that adjust easily to accommodate bulky foods. There's even a thoughtful "Odds and Ends" Basket to store small jars and packages.

In addition to all these competition-stopping advantages, Servel gives you its silent, motorless freezing system the only freezing system guaranteed for *ten full years!* Right now's the time to really push the great new Servel line. With hot summer weather causing more electric refrigerator breakdowns, the replacement market will be wide open. So take advantage of this wonderful opportunity. For suggestions write Servel, Inc., Dept. J-16, Evansville 20, Indiana.



ROYAL TUDOR (Model BR-1118)

STAYS SILENT . . . LASTS LONGER

Servel

The GAS Refrigerator

PIPE LINE and GAS MAIN CONSTRUCTION SERVICES

26-mile Transmission Main to Prospect Street Plant for Citizens Gas and Coke Utility of Indianapolis, Indiana.

Construction of Distribution Main Extensions at Syracuse, New York, for Niagara Mohawk Power Corporation.

Companies taking natural gas are being provided by United Engineers with complete engineering and construction services for lateral pipe lines and distribution main extensions. Also, facilities for plant additions as required are being provided.

These services are flexible, and may be adjusted to suit individual needs. United Engineers will perform all phases of the work or any portion that may be required to augment the Engineering and Construction forces of the utility company.

UNITED ENGINEERS & CONSTRUCTORS INC

NEW YORK 17 PHILADELPHIA 5 CHICAGO 2

WITH A BACKGROUND OF OVER SIXTY YEARS' EXPERIENCE

Gradiation®

Blasts the Lid Off Production Processing Methods

Liquid Heat Treatment of petroleum and chemicals assures more and better products . . . less space for equipment.

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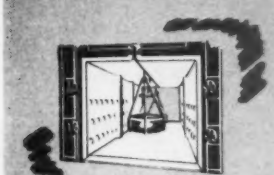
Gradiation . . . fusing and annealing delicate glass products on a precise production basis.



Gradiation . . . continuous heat treating of cast-steel military tank hulls.

Selas Precision Heat Processing Increases Yield . . . Boosts Quality

Selas Gradiation, which enables the Petroleum Industry to obtain greater yield from each barrel of crude, offers all industries proved benefits of high speed heat processing.

Gradiation utilizes radiant heat as a precision tool for *production-engineered processing* . . . Combines high-temperature, automatic operation, precise controllability and protective atmosphere. Whether you *spread* heat or *spot* it during production, Selas *Gradiation* can raise production speeds and qualities—can effect economies in labor and materials.

Let Selas engineers give you complete details on what *Gradiation* has done for others and what it can do for you!

SELAS CORPORATION OF AMERICA

PHILADELPHIA 34, PENNSYLVANIA

Heat Processing Engineers for Industry · Development · Design · Manufacture

Editorial:

Lip Service or Customer Service

TO those gas companies who are honestly facing the problem of proper policy with respect to servicing domestic appliances, we recommend the current practice of the Consolidated Edison Company of New York as a classic example of what not to do.

Consolidated Edison is a combination utility, of which two-thirds of its customers, and in our opinion 90 per cent of its interest and concern, are electrical. It is not only the biggest gas and electric system in the United States, perhaps in the world, but it also has more gas meters than any other company.

For a period of 13 years it was the most outstanding utility in the country in the distribution and sale of gas-fired refrigerators, putting around 200,000 of these units on its lines between 1927 and 1940. About 1940 it discontinued the sale of all appliances, and disbanded what was then known as its customer service department. It now operates a consumer service bureau employing about 900 men, who work on emergency and service calls, either gas or electric.

Whether or not this is enough manpower to adequately care for the normal complement of complaints and difficulties of over four million customers is a matter that is subject to debate.

On the face of it, however, the company claims that it does maintain customer service adequate to safeguard its legal responsibilities; and perhaps this is correct. Its view of the moral and ethical responsibility involved can best be evaluated in the terms of the statement released to the press on the occasion of the latest carbon monoxide death on its lines.

Consolidated Edison, in this statement said: "It is the responsibility of manufacturers and distributors of gas burning appliances to provide suitable replacement parts and adequate facilities for repairs of their products. The Consolidated Edison service organization is primarily devoted to answering trouble calls, but to the extent that it is not fully occupied it engages in repair work and appliance adjustment. It does not, however, intend to compete in any way with the organizations of the manufacturers or their agents."

As professional traffickers in the written word we doff our hat to this as a masterpiece of evasion.

Let us then, for the record, survey the results of this policy of "not competing in any way with organizations of manufacturers or their agents." Throughout the nation there are now approximately 3,700,000 gas refrigerators in use. Of these between 300,000 and 325,000 are on the lines of Consolidated Edison.

In the past 19 months in the entire United States there have been reported 28 deaths from carbon monoxide poisoning arising out of the improper use of gas refrigerators. Of these, 20 were in New York City, and 16 of the 20 were on the lines of Consolidated Edison.

As an immediate result of the most recent of these deaths, which occurred on April 29, the Health Department of New York City undertook on its own initiative a house to house inspection of all gas burning appliances. Since then the city inspectors, who have gradually been augmented to a crew of 54 men, have inspected 7,500 apartments and houses. As of May 28 they had found in these apartments: 3,238 defective gas ranges, of which 169 were ordered shut off; 524 defective gas refrigerators of which 82 were ordered shut off, and 212 other appliances, with seven ordered shut off.

In fairness to the utility, it must be recorded that New York is unique in that a very high percentage of the apartments are rented with gas and electric appliances included, and these remain the property of the landlord. Only recently the city specifically ruled that the safety of these appliances is the landlord's responsibility. With rents frozen since the war at uneconomic levels, it has been the disposition of many property owners to avoid any upkeep whatever, so long as they can legally do so.

There now exists in New York a horde of so-called gas servicing concerns, most of which have sprung up since Consolidated Edison stepped out of the picture. Some of them, no doubt, are both competent and conscientious; but they are in the minority. They take annual service contracts at ridiculously low prices; slipshod work is the standard rather than the exception, and their prevailing attitude is one of indignation toward their customers, the Health Department of the City of New York, and the Consolidated Edison Company.

At a recent meeting called by the Health Department, and attended by some 300 service men, the question was asked how many maintained 24-hour service. One hand was raised. How many had, and used, carbon monoxide indicators in their testing? Eight hands. It was obvious from the questions that were asked that most of them had never even heard of this essential piece of equipment.

With all of this welter of ignorance and irresponsibility to choose from, how is the gas consumer to be expected to select a competent and reliable service firm? If he goes to the gas company for advice, he is told that their names are all in the classified section of the telephone directory; that none are specifically recommended.

The purpose of this editorial is not to abuse one gas utility; particularly since that function is now being adequately handled by its customers. It is not to leap to the defense of the manufacturer of gas refrigerators, although in our opinion he has been dealt a savage injustice by the deplorable situation that has been allowed to burgeon and grow in the greatest concentrated market in the world for his equipment.

The point that cannot be made with too much emphasis is that if the gas utility shirks the burden of responsibility for the safe operation of every appliance on its lines, it is doing itself and the gas industry irreparable harm.

It is not enough to take refuge behind carefully worded statements, cooked up by the legal department, that render lip service to this obligation, the while its larger implications are arrogantly ignored.

It is not enough merely to be ready to render service if it happens to be called for. There must be an unremitting consumer campaign of education in the limitations and dangers of gas appliances if they are mistreated, neglected or abused. The abyss of oblivion is yawning in front of the gas industry if it allows the base load appliances—the ranges, water heaters and refrigerators—to come under the cloud of public disapproval and mistrust.

There is a need for a national policy of minimum service standards to which every gas company should subscribe. The drafting and promulgation of that policy is worthy of the immediate attention of the best mentalities that the industry can muster.

Elliott Taylor

Increased Economic Importance Seen For Natural Gas Pipe Lines

by Howard J. Carswell
Guaranty Trust Co. of New York

Mr. Carswell is a graduate of Purdue University, Lafayette, Ind., B.S. in engineering, class of 1925.

He was a newspaperman in Chicago and New York for many years. Following wartime service, he was a public relations executive in Washington for the Bituminous Coal Institute.

He is now manager of the publicity department of Guaranty Trust Company.

H. J. Carswell

THE dynamic growth of the petrochemicals industry endows natural gas with a new strategic significance to America's industrial civilization. Along with its great and increasing importance as a fuel, natural gas as a *chemical raw material* is playing a fundamental role in the manufacture of synthetic organic chemicals whose end-products mean so much to modern living. Among those having massive markets are new and better synthetic textiles, explosives, plant foods, synthetic rubbers, plastics and resins, lacquers and so on. The potentialities of natural gas, as distinguished from liquid petroleum, are portentous.

This ultra-modern industry is located largely in the southwest, notably in the Texas-Louisiana gulf, and since World War II has represented a most significant industrial development of our time. Historically the "chemical revolution" of synthetics was pioneered by the colorful by-product chemistry resulting from the high temperature carbonization of coking coal. Coal tar chemistry's importance will continue, but America's consuming needs for the basic organic chemicals have been expanding so much that coal tar as a source is inadequate. Chemical manufacturers have been going to petroleum and natural gas for their raw materials, and oil refining technology has been trending into chemicals.

Manufacturers of chemicals and liquid and gaseous fuels are becoming half-brothers, in a functional sense. Considered as to volume and dollar value of products, petrochemicals represent today only a very small fraction of the enormous productivity of liquid and gaseous fuels. As to technological significance, however, the chemicals from oil and natural gas are becoming necessary in our modern technology which gives us dyestuffs, artificial flavors, medicinals, solvents, food colors, synthetic textiles, plastics, cellophane, lacquers, synthetic rubbers, explosives, nylon, rayon, orlon, detergents, and many other things too numerous to mention here. These have their origins in oil, gas and coal.

In a lay sense, natural gas is regarded as the gaseous phase of the amazing conglomeration of hydrocarbon molecules which make up petroleum. Our concern here is with *natural gas* alone (not petroleum) as a starting basis. Refinery gases are excluded. The manufacture of carbon black and the sulphur extraction processes are outside of this scope, even though they are related.

As it comes out of the ground, natural gas is a complex and variable substance. It is chiefly methane (CH_4) with varying proportions of the heavier components as ethane, propane, and butane. It is prone to have differing proportions of impurities as sulphur, carbon dioxide and nitrogen, which can be as high as 15 or 18 per cent.

The natural gasoline components are scrubbed out. Propane and butane are removed, for they have big commercial value as fuels with expansive outlooks and chemical potentialities. Since this is a chemical story, it is in point that they also are important as raw materials. For example, the Celanese Corporation of America won a meritorious award for developing its process for using them. At the Celanese plant at Bishop, Texas, these hydrocarbons are reacted with oxygen from air to produce a wide range of chemicals. A major one is acetaldehyde, which is made into the acetic acid which the company requires in big volume for making its acetate rayon and acetate plastics. The chemical reaction additionally produces formaldehyde, methyl alcohol, normal propyl alcohol, butyl alcohols, propylene glycol and solvent mixtures. Among their principal uses are plastics, resins, and solvents. Celanese Corporation will build a new, supplementary plant in the Texas panhandle at Pampa.

Methyl alcohol is a basic chemical of great commercial importance. Historically known as "wood" alcohol, it came from wood and subsequently primarily from coke oven gas. Today most of it is synthesized from natural gas. The same manufacturing facilities produce formaldehyde, which is likewise very big commercially. Among formaldehyde's bulk markets are the phenol-formaldehyde and the urea-formaldehyde plastics. The vinyl plastics have a growing significance, and these derive generally from either natural gas or the refinery gas, ethylene. Butadiene for synthetic rubbers may start out from butane obtained from natural gas. Urea for plastics, fertilizers, etc., is another important chemical.

Acrylonitrile looms as a basic chemical of great importance. It provides "orlon," the new textile which will challenge wool for many uses. Acrylonitrile is devised from acetylene and hydrogen cyanide, both of which are made from natural gas.

Acetylene is a story in itself, and whatever its commercial importance is today, the potentialities are more impressive. It is a "building block" for organic chemicals. Being the lightest of the *unsaturated* hydrocarbons (C_2H_2), it is highly reac-

tive and therefore eager for chemical synthesis. To produce it, methane may be partially burned with oxygen to a high heat, then instantly quenched.

On May 4 it was learned that Union Carbide & Carbon Corp. has developed a new process for producing acetylene from methane and oxygen in a commercial scale plant at Texas City. The output is currently used for producing its vinyl resins, but its potentialities are much more significant, especially for acrylonitrile and acetic acid.

One of its potentialities may be for benzene, the aromatic "ring" molecule which is so basic to a broad range of products which include explosives, perfumes, dyestuffs, phenol, and medicinals as aspirin. The aromatic hydrocarbons have been called "psychological" chemicals because of the picturesque variety of products characterized by color, taste and smell. Currently there is a world shortage of benzene, which has been coming mostly from the coking of bituminous coal, although it does come importantly out of petroleum.

In the developing chemical picture of natural gas there are three phases which impress a lay observer.

One is the synthetic fuels venture of Carthage Hydrocol, Inc., on the Texas Gulf at Brownsville. This pioneer plant has experienced technical "bugs" which were not to be unexpected in starting a new industrial frontier. This plant is due to be in full operation soon. Carthage Hydrocol itself is devoted to the manufacture of synthetic gasoline and liquid fuels out of natural gas, and its process is a much improved adaptation of the Fischer-Tropsch technique. It is very significant that the Hydrocol method produces an accompaniment of crude chemicals in big bulk, and these go into the contiguous plant of Stanolind Oil & Gas for separation and processing. Its economic success remains to be proved, but this venture is attracting widespread interest. The bulk chemicals by the Hydrocol process are generally alcohols, aldehydes, ketones and organic acids, with ethyl alcohol and acetic acid being the principal ones.

The technique involves a transformation of methane and oxygen into a mixture of carbon monoxide and hydrogen, which is called "synthesis gas." By catalytic procedure it becomes gasoline and liquid fuels, but the technique using synthesis gas is so versatile it can be manipulated to produce other things, especially ammonia. Ammonia is the common carrier of nitrogen, and it is simple to take ammonia and manufacture nitric acid, the daddy of explosives, and bulk market fertilizers such as ammonium nitrate or ammonium sulphate in conjunction with sulphuric acid.

Today between 40 and 50 per cent of the nation's ammonia comes from natural gas. In the fertilizer phase of petrochemicals the Lion Oil Co., at El Dorado, Arkansas, and Spencer Chemical Co. figure among the important ones. Spencer Chemical Co., with plants at Pittsburg, Kansas, and elsewhere, uses natural gas with steam and air for producing nitrogenous products. Phillips Chemical Co. makes anhydrous ammonia, nitric acid and fertilizer, and the Mississippi Agricultural Chemical Co. will produce ammonia products at Yazoo City. Commercial Solvents Co. is expanding its facilities at Sterlington, Louisiana, where it makes ammonia and methyl alcohol, among other things.

Other prominent chemical manufacturers in the natural gas picture include Dow Chemical Co., for vinyl and styrene plastics; Carbide & Carbon Chemicals Corp., and Monsanto Chemical Co. at Texas City, and the Tennessee Eastman Corp. which is coming along with a new plant at Longview, Texas. Cities Service Oil Co. is a veteran producer at Tallant, Oklahoma, of formaldehyde, methyl alcohol and related oxygenated substances.

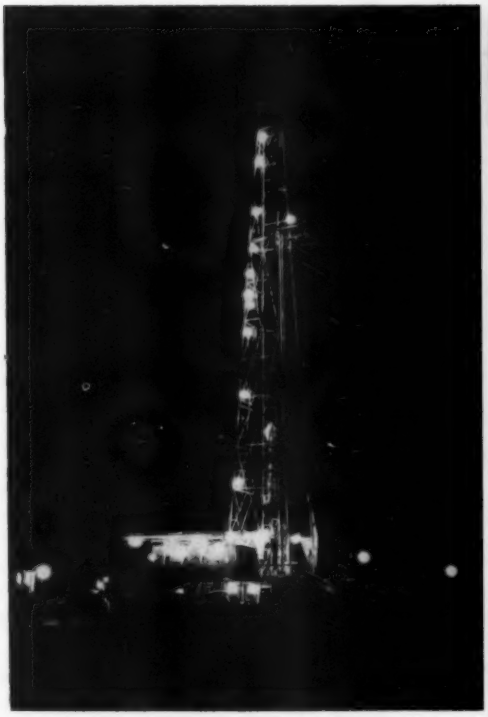
Pipe Line: What Flows?

A third phase which is attracting attention is the arrangement between Mathieson Chemical Corp. and Tennessee Gas Transmission Co. for withdrawing, at Gabe, Kentucky, heavier molecular components out of the fuel gas stream as it flows through the pipe line to eastern fuel gas markets. As explained, natural gas is a complex and variable substance. Fuel gas moving through a pipe line may be regarded, for this purpose, as maybe 95 per cent methane, two or three per cent of ethane and heavier molecules, and a dilution of nitrogen of perhaps one per cent or so.

Apparently Mathieson Chemical Corp. seeks the ethane out of the fuel gas as it flows to market. In itself ethane (C_2H_6) is relatively stable and non-reactive, but by high temperature cracking it produces ethylene, which is very important. As a matter of fact, it was its brilliant pioneering with refinery gas ethylene which gave Carbide and Carbon Chemicals Corp. its opportunity and great achievement in petrochemicals back before the war, and today this company manufactures an impressive range of chemical products. Among the important ethylene compounds are anti-freeze, acetone, ethyl alcohol, etc.

Or with ethane the processor can go in another direction to make "synthesis gas," and thence to ammonia, methyl alcohol and formaldehyde.

If a pipe line can be tapped for chemical raw materials in Kentucky, far from where the natural gas originated, then why cannot other chemical plants be located elsewhere along the long-distance



Lone Star Producing Co. oil well.

"natural gas is a complex and variable substance . . ."

pipe lines? That is an interesting question.

Does the withdrawal of the heavier components in the pipe line detract from the heating value of the fuel gas? Trying to prejudge the marketwise and economic effects is outside of the intent of this article. Ethane and propane have higher heating values than methane. However, it is methane which is the marketable fuel gas having fundamental abundance. The market for industrial and domestic heating gas is adjusted, consumer-wise and price-wise, to a range of 950 to 1,050 Btu per cubic foot. For that purpose the pipelined fuel gas, although stripped of heavier components, would seem to be unimpaired in a practical sense to this lay observer.

As to strategic significance, it is obvious that our ultra-modern industry of petrochemicals is giving natural gas a new social significance. It is in point that these plants require fuel gas, too, along with that subjected to chemical processing. In the foreseeable future it appears that the overwhelming consumption of natural gas will be as a fuel, and the known natural gas reserves are mostly committed to pipe line and gas utility purposes.

Consider these virtues as a chemical raw material. From the chemist's viewpoint, natural gas is relatively high in purity. Its composition, if variable, is

(Continued on page 40)

US Supreme Court Upholds Public Service Commission In Michigan-Panhandle-Ford Case

The Supreme Court of the United States on May 14 upheld the right of states to regulate the sale of natural gas piped across their borders if it is to be sold in competition with an established utility. The high tribunal ruled specifically that Panhandle Eastern Pipe Line Co. must get approval of the Michigan Public Service Commission before it sells natural gas to the Ford plant at Dearborn, Mich.

Justice Sherman Minton delivered the 7-2 decision. Justice Felix Frankfurter wrote a dissenting opinion in which Justice Douglas joined. Panhandle pipes gas from Texas, Oklahoma and Kansas. It contracted to deliver 25,000,000 cu. ft. daily to the Ford plant, but legal difficulties arose.

A Michigan law says no public utility may sell any service in a municipality where another utility is providing the same service unless the newcomer first gets a certification of convenience and necessity from the state commission. The commission ordered Panhandle to hold up on the Ford sale until it got a state certificate. Dearborn already is served by the Michigan Consolidated Gas Co. Panhandle contested the order in Michigan courts, but lost. It then appealed to the Supreme Court, contending no state has the power to prohibit such interstate sales. The state commission contended it had not barred interstate sale of gas. It said the door was open for Panhandle to get a hearing and that the commission sought only to "regulate natural gas rates and service on the local level and to protect this system of local regulation from the evil effects of an aggressive monopoly."

Justice Minton, agreeing with the commission, said: "The sale and distribution of gas to local consumers made by one engaged in interstate commerce is essentially local in aspect and is subject to state regulation without infringement of the commerce clause of the Federal Constitution. In the absence of Federal regulation, state regulation is required in the public interest." Justice Minton said Panhandle Eastern in this case was asserting "a right to compete for the cream of volume business without regard to the local public convenience or necessity." Justice Frankfurter insisted the matter was entirely one for regulation by the Federal Power Commission, saying: "The commerce clause sought to put an end to the economic autarchy of the states."

New Features of Automatic Gas Ranges Explained At 'CP' Editor's Round Table Conference

The 28,000,000 housewives who cook with gas will turn green with envy when they discover the spectacular improvements manufacturers have built into automatic gas ranges in the past year.

Now available in many advanced styles are ranges featuring added insulation for cooler cooking, faster burners for speedier cooking and new designs that make ranges easier than ever to clean. Among specific improvements are oven and topburner clock control which starts and stops cooking automatically, and built-in range units permitting any desired kitchen layout.

The story of this leap forward in modern living was unfolded on May 18 before editors of many of the nation's leading magazines and newspapers, meeting at the Waldorf-Astoria Hotel in New York for the annual editor's "CP" round table conference.

Opening the meeting of more than a hundred women's page and magazine editors, Tom Gibbons, of American Stove Co., noted that numerous innovations in design and operation have been incorporated in 1951 range lines as a result of suggestions from readers which were submitted by the editors at last year's conference.

The new functional advantages in "CP" ranges, Mr. Gibbons said, mean that "in a very real sense the public has helped design the modern range."

A large representation of range manufacturers welcomed the editors who were treated to a colorful display of ranges with approximately 30 new features. Ruth Soule, home service director of the Brooklyn Union Gas Co., presided as moderator during the day-long session.

While women editors from the nation's leading publications attended the 1951 editors "CP" round table conference in New York, H. Leigh Whitelaw (left), managing director of the Gas Appliance Manufacturers Association, and E. Carl Wolf, managing director of the American Gas Association, exchanged notes on the progress of the meeting.

Ruthenburg Elected President Of Gas Appliance Ass'n

Louis Ruthenburg

Delegates to the Gas Appliance Manufacturers Association's 16th annual meeting in Chicago elected Louis Ruthenburg president for the year beginning October 1. Mr. Ruthenburg, chairman of the board of Servel, Inc., succeeds Frederic O. Hess, president of Selas Corp. of America, Philadelphia.

Other newly-elected officers include: A. B. Ritzenthaler, Tappan Stove Co., first vice-president; James F. Donnelly, A. O. Smith Corp., second vice-president; Lyle C. Harvey, Affiliated Gas Equipment, Inc., treasurer, and H. Lee Whitelaw, secretary.

Colorado Interstate Asks FPC To Approve Expansion Plans

Colorado Interstate Gas Co. of Colorado Springs, has applied to the Federal Power Commission for authority to build facilities designed to increase the capacity of its recently-authorized 216-mile natural gas pipe line extending from the West Panhandle Gas Field in Texas to a point in Cheyenne County, Colo.

The company plans to engage in a two-year construction program, estimated to cost $3,453,105, to enable it to meet the anticipated needs of its resale customers in the Rocky Mountain market area. Colorado said that during the past winter its peak day requirements in that area were 367,490,000 cu. ft., which it was able to meet only by overproducing some of its wells and by emergency purchases of gas. The anticipated peak day firm demand during the 1951-52 winter is 410,643,000 cu. ft., and during the 1952-53 winter it will be 435,839,000 cu. ft.

The company is proposing during 1951 to increase the horsepower of its new Panhandle Field compressor station from the presently authorized 4,800 horsepower to 6,600 horsepower and to install an additional 1,320 horsepower unit at its Kit Carson (Colo.) compressor station. Colorado also plans during 1951 to build 30 miles of 20-inch loop line extending from a point in Elbert County, Colo., to the Limon, Colo., area, and to construct 19 miles of 6⅝-inch lateral connecting line in the Fort Lynn, Colo., area connecting the company's existing system with the authorized 216-mile line.

During 1952, Colorado plans to install two additional 1,320 horsepower units at the Panhandle Field station; to install one additional 1,320 horsepower unit at the Kit Carson station to bring the total installed horsepower there to 11,040; and to build 18 miles of 20-inch loop line on its Kit Carson-to-Denver pipe line.

NATURAL GAS COMES OF AGE

by Stuart M. Crocker

Chairman, Columbia Gas System, Inc., New York

Stuart M. Crocker

Mr. Crocker read this paper at the meeting of the division of production of American Petroleum Institute, at Columbus, Ohio, early in April. A portion of the paper, dealing with underground storage and the peak problem, appeared in the April issue of American Gas Journal, and is not repeated here.

THE natural gas industry in the past five years has spent nearly 3¼ billion dollars for the construction of new facilities and this does not include the considerable amounts spent by the independent producers. If conditions permit, the next five years will see a similar growth.

Even more remarkable is that to a large extent the construction program was financed by the sale of securities; not only securities of known and existing companies, but of new companies which were able to sell hundreds of millions of dollars of securities because of the public's acceptance of natural gas. Being a "regulated industry" we had no way of financing any substantial part of this phenomenal growth out of retained earnings.

The natural gas industry today is far different from what it was just a few years ago. It has come of age and it can and must play a most important part in supplying the future energy needs of the country. On the petroleum and natural gas industries will fall much of the burden of supplying our country with its vast fuel requirements in the critical days which are ahead.

One of the best indications that the natural gas industry has come of age is the fact that it is beginning to receive even more intensified attention from governmental bodies. More and more we find new proposals for its further regulation and taxation. That is one of the prices paid for success. But we of the industry must present a united front against those who would unjustly interfere with its growth and prosperity through unreasonable taxation or regulation.

The history of the Appalachian area is most important because it was here that the natural gas industry was born. For many years it was the leading gas producing area of the nation. The development of long-distance pipe lines began here. Until 1931, West Virginia led the nation as an exporter of natural gas and as recently as 1949 nearly 30 per cent of the domestic natural gas sales of the nation were made in the Appalachian area.

To emphasize its importance, I should like to quote several statements regarding the Appalachian area which appeared in Federal mineral yearbooks. The first says: "The great increase in the consumption of natural gas was due chiefly to efforts of well established companies who are engaged in producing the gas and transporting it over exceptionally great distances." The second reads: "Interconnecting pipe line systems to supply this territory form a complicated network over the entire region from the Allegheny Mountains west beyond the Ohio-Indiana line, and from northern Kentucky north to Lake Erie. These pipe lines form one of the most elaborate systems for the transfer of energy yet developed by engineering science."

These two statements are descriptive of Appalachian natural gas operations today. But those who think of natural gas as a new and untried industry may be surprised to learn when they were made. The first one was made nearly 45 years ago. The second one was made 30 years ago.

However, during the years the Appalachian natural gas industry has had its days of feast and famine. Its obituary has been written on several occasions. Its more recent history, however, shows what has taken place to bring about the dynamic growth of the industry.

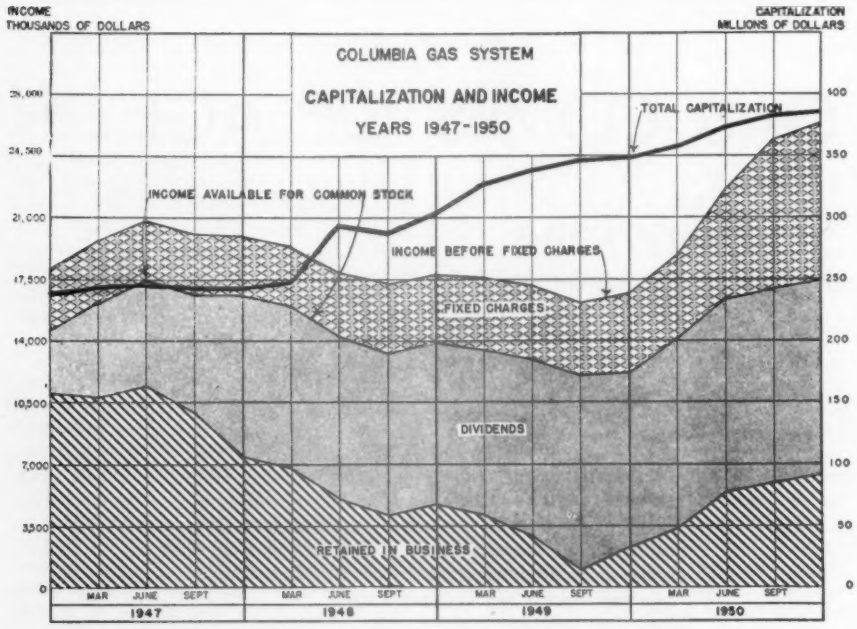
In the late thirties Appalachian gas supplies were not increasing, and only by maintaining high rates of production was it possible for companies in this area to meet the requirements of their customers. In fact, some of the companies of the Columbia Gas System, in order to augment the supply of gas, had, several years previously, contracted for the purchase of coke oven gas from industrial plants.

It was true that substantial reserves of natural gas were being developed in the southwest. It was also true that the art of transporting gas had been sufficiently developed so that gas could be imported from those far distant areas of the country. But economic conditions did not justify the huge expenditures needed to construct the necessary facilities.

A Critical Situation

Certainly it seemed that we could not depend to any great extent upon future sales to industry. Operating in the heart of the bituminous coal region, we were ever aware of the competition of that low-priced fuel. The domestic picture was also uncertain. Electric utilities were competing for our cooking load. Additional house heating was a possibility, but natural gas was then a luxury fuel for that purpose, at least when compared with coal. Furthermore, we were competing with oil for both the domestic house heating and industrial businesses.

Probably the best barometer was the security market. Money had been raised in the early thirties for the building of pipe lines from the southwest to Chicago, Detroit and to some other sections. But money markets were drying up and you did not find investors who believed in the future of the natural gas industry



Income figures are for the 12 months with periods ending quarterly.

to the extent that they were willing to provide the huge sums of money needed for the facilities to transport the gas from the southwest. There seemed to be strong reason to believe at that time that the Appalachian natural gas industry, as it was then constituted, had seen its best days and was faced with a period of declining activity and eventual extinction.

World War II aggravated the problem. Even though the Appalachian area was over-produced, it was impossible to meet the demands of industry for fuel. In addition, in spite of war time restrictions, domestic consumption was increasing. The situation became so critical that it became imperative for the Appalachian distributing companies to obtain new sources of supply. This meant importing gas from the southwest. By today's standards, Columbia's first long-term contracts for southwest gas for 200 million cu. ft. per day were not substantial. But in 1943, when they were negotiated, they were a major commitment.

That is the uncomfortable situation we were in but then two new influences began to appear which led to the rejuvenation of the natural gas industry. One was the major increase in the nation's proved gas reserves. The other was that natural gas, which had been a premium fuel, quickly became the cheapest of fuels. This, coupled with the fact that natural gas was the most desirable fuel for house heating and for many industrial purposes, immediately caused a tremendous demand.

Comparative Fuel Costs

At present rates of consumption domestic natural gas reserves are greater than are domestic oil reserves. As to the price situation let me use the situation in Columbus, Ohio, to illustrate its importance. As just mentioned, natural gas for many years was a premium fuel, particularly by comparison with bituminous coal, our main competitor. By 1945 price levels had changed sufficiently so that at that time the cost of heating an average six room home in Columbus was about the same with natural gas and coal, while the cost of heating with oil was somewhat higher. Since 1945 natural gas rates have remained practically the same but both oil and coal retail prices have increased materially. As a result, for the year 1950, heating this average home in Columbus cost the home owner $207 with oil, $143 with bituminous coal, and only $89 with natural gas.

A price differential such as this naturally brought a tremendous demand for natural gas. In 1949 and 1950 in our own service area nearly 200,000 house heating customers came on our lines. Of these about 70,000 were new customers while the balance of 130,000 represented customers who already were using natural gas for other purposes such as cooking, water heating and refrigeration and who were changing over from other fuels to heat their homes with gas. Today about half of our residential customers are heating with natural gas. The demand is still continuing to such an extent that substantial restrictions on further house heating installations have been in effect since the middle of 1950.

Factors Influencing Natural Gas Prices

I previously mentioned how fuel costs have changed in the past few years and you may wonder what happened to bring about this change. There are several reasons. First, I believe that, considering all costs of producing, transporting, processing, storing and distributing, natural gas can be delivered to the customer with less labor than can either coal or oil. Since rising costs are largely attributable to increased labor rates, natural gas prices which contain a small proportion of labor costs were not nearly as much affected as were the prices of coal and oil.

Usually as an offsetting item is the fact that utilities are required to invest a substantially greater amount in property to obtain a dollar of revenue than are other industries. However, improvements made in the art of transporting natural gas have mitigated this influence somewhat. Today natural gas is transported at much higher pressures, so that a greater volume of gas can be delivered without a proportional increase in capital investment even though the cost of installing and operating facilities is much greater today than it was several years ago. This is one of the things which accounts for the price differential. But there is another which is the most important.

Ours is a regulated industry. Our rates are determined not by competition but by regulation, with the courts available to settle disputes between the utilities and the regulatory bodies. The attitudes of regulatory commissions and the courts are, therefore controlling, insofar as rates are concerned. This is one of our major problems and I would like to discuss it rather fully since it has a great bearing on the health of the industry and, therefore, upon all who are concerned with any phase of the natural gas business.

Capitalization and Income

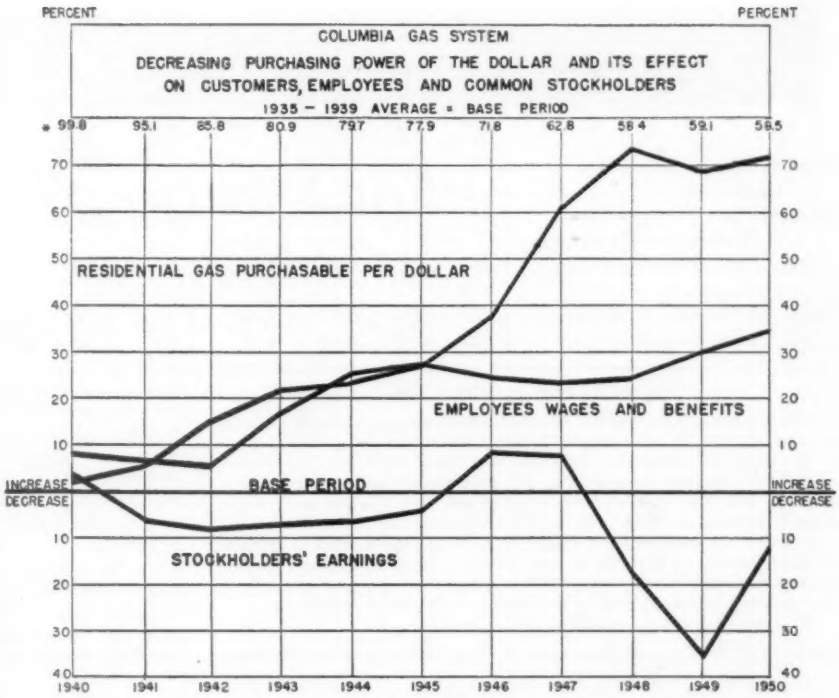
The chart on this page compares the capitalization and income of our system for the years 1947 through 1950. At the top is a solid line showing capitalization—that is, the dollars employed in our enterprise. Below that is shown 12 months net earnings broken down to show the amount required for interest and other fixed charges, the amount paid out in dividends and the amount retained in the business.

During 1947 and the first quarter of 1948, capitalization and income maintained a somewhat stable relationship. However, we were financing a very substantial construction program and the new property brought no immediate earnings. So we were faced with rising labor and material costs without a corresponding increase in revenues. The result was that our net income started downward. So here for an extended period you find increasing capitalization and decreasing income. The downward trend continued

for more than two years and was not halted until the end of 1949, when our new property began to produce more revenues.

Currently earnings in relation to capitalization are about back to their 1947 level; but that does not recover the earnings which were lost during the period of construction. What would we do if we were an ordinary business competing with coal and oil without regulatory restrictions? Why, we probably would have raised our prices in order to maintain earnings at a proper level. But in a regulated business such as ours it is very difficult to obtain increased rates to take care of such a temporary situation. Regulatory authorities should grant rate increases promptly during periods of unusual expansion entailing huge increases in capital investments. Where they fail to grant such increases, they should be equally slow to pounce on the utility companies when earnings subsequently improve.

This chart is intended to show what happened during a construction period and is not intended to show the earnings which should be realized by a utility company. That involves still another problem.


PERCENT
PERCENT
COLUMBIA GAS SYSTEM
DECREASING PURCHASING POWER OF THE DOLLAR AND ITS EFFECT
ON CUSTOMERS, EMPLOYEES AND COMMON STOCKHOLDERS
1935 – 1939 AVERAGE = BASE PERIOD
* 99.8 95.1 85.8 80.9 79.7 77.9 71.8 62.8 58.4 59.1 58.5
RESIDENTIAL GAS PURCHASABLE PER DOLLAR
EMPLOYEES WAGES AND BENEFITS
INCREASE
DECREASE
BASE PERIOD
STOCKHOLDERS' EARNINGS
1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950

* These figures represent purchasing power of the dollar, with years 1935 through 1939 as base period. US Bureau of Labor Statistics.

Threefold Trusteeship

I have a philosophy about our business. It is that in our enterprise the customer, the employee and the stockholder are partners and that we of management are responsible for their interests. To illustrate this point refer to the chart on this page which shows how the residential customer, the employee and the common stockholder of Columbia Gas have fared during the past few years.

Using the period of 1935 through 1939 as a base, we have shown on this chart by percentage changes what has happened to these three partners in our enterprise. In doing this we have recognized the decreasing purchasing power of the dollar and have indicated at the top of the chart the present relationship of each year's dollar to the dollar of the base period.

Now let us take a look at the three groups starting out with the residential customer. The price of residential gas today is approximately the same as it was during the base period, so that after we recognize the fact that he is paying for his gas today with a depreciated dollar, he is, in effect, receiving 72 per cent more gas for his money today than he was in the base period.

Next take a look at the employee. He has not fared as well as the customer, but average wages and benefits have increased steadily. In 1950, even when adjusted to reflect the depreciation of the value of the dollar, average wages and benefits were about 35 per cent more than they were in the base period. Just so there will be no misunderstanding as to how the employee has fared, let me relate the employees' figures to the more familiar measure—the cost of living. Comparing the 1950 figures with the same base period used on the chart, the index for employees' wages and benefits had risen for 1950 to 231, which was 60 points or 35 per cent greater than the increased cost of living.

But now look at the third partner, the common stockholder. He started out all right in 1940 but then came World War II. Tax rates were increased and an excess profits tax was enacted which imposed an unfair tax burden on many utilities. Fortunately this inequity has been corrected in the current excess profits tax, but during the war years of 1941 through 1945, stockholders' earnings were hit severely. After the excess profits tax was repealed in 1946, his earnings improved somewhat; but then came the construction program. This time he was really hurt. Currently his earnings have again improved somewhat, but even today his earnings per share of common stock, when adjusted for the depreciation of the dollar, are 12 per cent less than they were in the base period. Obviously if these three partners are to receive comparable treatment, something must be done for the stockholder. His earnings must be increased. I would like nothing better than to be able to tell our more than 74,000 Columbia stockholders—men and women who have invested hard cash in our enterprise—that they will receive fair treatment from all regulatory bodies.

Regulation Must Recognize Depreciation of Currency

Today Columbia Gas System operates in seven states and its local operations are in general subject to the jurisdiction of the state regulatory commissions. In addition many of our operations are subject to the jurisdiction of the Federal Power Commission. Regulation is nothing new. Utility companies have lived under it for many years, but one question has had no permanent answer. What amount should a utility be permitted to earn? Over the years many methods of arriving at this answer have been tried—reproduction cost new, fair value, prudent investment, return on capital and original cost—these are the ones which have been used most frequently. Currently the trend in the Federal courts seems to be that it does not matter which method is used as long as the "end result" is fair and equitable. This has been further amplified as meaning that a utility should be permitted to earn an amount which will permit it to retain its financial integrity, provide a fair return to its security holders, and attract new capital. I would not quarrel with this theory; but, since the "end result" can be subject to many interpretations, it still does not answer the question of what are proper earnings. Many state regulatory commis-

(Continued on page 42)

Index of Yields : Selected Utilities Stocks

	May 1951	Apr. 1951	Mar. 1951	Feb. 1951	Jan. 1951	Dec. 1950	Nov. 1950	Oct. 1950	Sept. 1950	Aug. 1950	July 1950	June 1950
Natural Gas Transmission Companies	5.35%	5.22%	5.38%	5.31%	5.36%	5.97%	5.62%	5.19%	5.71%	5.46%	5.76%	4.86%
Natural Gas Transmission & Distribution Companies	5.45	5.43	5.35	5.31	5.47	5.67	5.46	5.40	5.61	5.71	5.79	5.29
Manufactured & Mixed Gas Companies	5.35	5.23	5.22	5.21	5.22	5.56	5.46	5.24	5.52	5.55	5.76	4.98
Class "A" Electric Companies	5.88	5.52	5.49	5.65	5.62	6.19	6.03	5.56	5.67	5.59	5.64	4.94
Class "B" Electric Companies	5.94	5.72	5.66	5.78	5.80	6.38	6.06	5.99	6.06	6.35	6.41	5.58

Method of Compiling Index of Yields

This is a straight arithmetical index of comparative yields obtainable on a selected group of gas and electric utility industry common stocks.

The companies comprising this index have been selected by the AMERICAN GAS JOURNAL as providing a representative cross-section of each industry, from the standpoint of geographical diversification and of the relative importance of the individual companies in their areas.

No effort has been made to weight the average to give effect to changes in capitalization or in dividend rates because the yields afforded on the issues reflect such changes. The index is designed to show the rate of return and not necessarily market movements on the stocks comprising it.

The companies used in compiling this index are:

Natural Gas Transmission Companies: El Paso Natural Gas Co.; Northern Natural Gas Co.; Panhandle Eastern Pipe Line Co.; Southern Natural Gas Co.; Tennessee Gas Transmission Co.

Natural Gas Transmission and Distribution Companies: Columbia Gas System, Inc.; Consolidated Natural Gas Co.; Lone Star Gas Co.; Oklahoma Natural Gas Co.; Pacific Lighting Corp.

Manufactured and Mixed Gas Companies: Bridgeport Gas Light Co.; Brooklyn Union Gas Co.; United Gas Improvement Co.; Peoples Gas Light & Coke Co.

Class "A" Electric Companies: Boston Edison Co.; Commonwealth Edison Co.; Houston Lighting & Power Co.; Southern California Edison Co., Ltd.

Class "B" Electric Companies: Dayton Power & Light Co.; Hartford Electric Light Co.; Pennsylvania Power & Light Co.; Public Service Co. of Colorado; San Diego Gas & Electric Co.

John F. Falvey

A BETTER tone has injected itself into the bond market during the past several weeks. It is not yet reflected in a reduction in the yields obtainable on corporate securities, it is true, but the factors present conceivably could serve to bring about such a development.

"The market has lost some of its nervousness," in the opinion of some of its closest and most discerning observers, "and bidders are not as cautious today as they were a while back."

One of the principal factors contributing to this is the practical disappearance from investment dealers' shelves of inventories of unsold securities. The total of corporate bonds and stocks, exclusive of equipment trust certificates, stands at only about $2,000,000 at this writing. This total is only a drop in the proverbial bucket.

With the inventory nearly non-existent and with fears concerning the government bond market having subsided, for the time being at least, bidders for prospective corporate bond issues now can concentrate on the business at hand, with a possible better break for the seller.

Another favorable development from the standpoint of utility company managements has been the success of recent utility stock offerings, particularly those which have been offered through rights with oversubscription privileges to stockholders. Recent issues of this type have been far oversubscribed. The Long Island Lighting Co. offering of 524,949 shares is a case in point. This set the pace with total requests for 1,038,902 shares, for a subscription rate of 197.9 per cent. Shareholders under their primary rights on a one-for-six basis took 511,583 shares and left only 13,366 shares for employees, who had asked for 30,781 shares. Although stockholders under their oversubscription privilege asked for another 496,538 shares, they will get nary a one of these.

A stable utility stock market in the face of an unsettled one for industrial and railroad securities has contributed to the success of these recent utility offerings. But an equally strong underlying force contributing to their success is the feature whereby purchasers can buy on margin these stocks sold through rights and obtain far greater yield return by putting up in cash only 25 per cent of the purchase price and borrowing the remainder at a low interest rate. Dividends received on the shares thus obtained exceed with a wide margin the interest on the bank loan and afford a very liberal return on the limited capital employed.

By whatever means obtained, the results have been most beneficial for the utility companies and the success of these stock offerings should serve as a welcome beacon for other utility managements facing the need for further financing.

Common stock offerings in May comprised approximately 36 per cent of all security sales by utilities, compared with 39 per cent in April and with only 22 per cent in the first three months of 1951.

The market in which these utility stocks were brought out has been a very stable one. Proof of this is afforded in the fact that the average yields on the groups making up AMERICAN GAS JOURNAL index now are but little changed from what they were four months ago, despite the sharp drop witnessed in the interim in industrial stocks. There has been a revival of interest in utility stocks by investors as "defensive" holdings as a fairly risk-free means of obtaining liberal yield return.

Earnings have completely covered the total of dividend payments by utilities to date in 1951 and, while the spectre of still higher federal income taxes poses a threat, the impact of this is being mitigated for most companies in the utility industry by sharply expanding properties to take care of increasing loads.

Natural gas companies have had steady recourse to the equity market for new funds during the past several years, as exemplified by Southern Natural Gas Co. and American Natural Gas Co. The former has made two entries into the market for common stock money in less than two years and has broadened its equity base by better than 20 per cent as a result.

American Natural Gas now is preparing to come into the common stock market for the third time in little more than eighteen months and in so doing will have increased its equity by more than one-third.

And the end in each case, as for most other utilities, conceivably is nowhere in sight.

Graphs Show Vaporization of Liquid In Propane Tanks

by Art E. Wastie

Chief Engineer, H. Emerson Thomas and Associates

Westfield, New Jersey

TO steal a phrase from Shakespeare —"to use vaporizer or not to use vaporizer, that is the question!"

Many times the question arises, especially on peak shaving installations using propane: Is it necessary to turn on the vaporizers?

For comparatively short-time peak shaving it is possible to obtain sufficient vapor from the storage tank itself without passing liquid propane through the vaporizer.

It is a well-known fact that the vapor pressure of a gas bears a direct relationship to the temperature and that the latent heat of vaporization is the amount of heat required to convert a liquid to a gas (also known as boiling point) at given pressure and temperature conditions; and further:

"The rate of heat transfer has been set at 2 Btu per hour per degrees temperature differential per sq. ft. of tank area in contact with the liquid."

Knowing these basic gas laws, we can evolve a formula to determine the amount of liquid propane vaporized in a standard storage tank in one hour.

$$\frac{2 \text{ Btu} \times (T_1 - T_2) \times \text{wetted area in sq ft}}{\text{LH per gal.}} = \text{Gal/hr}$$

T_1 = Outside air temperature in degrees F

T_2 = Ultimate temperature in degrees F of propane liquid at minimum required pressure condition

LH: per gal. = Latent Heat of vaporization (in Btu's) to vaporize one gallon of propane at T_2

As an example, let us assume that a 30,000 (wc) tank is half full of propane (wetted area = 1014 sq. ft.) and the outside air temperature is 80° F and the required vapor pressure can be as low as 10 psi gauge. How many gallons per hour is available due to the vaporization of liquid in storage tank?

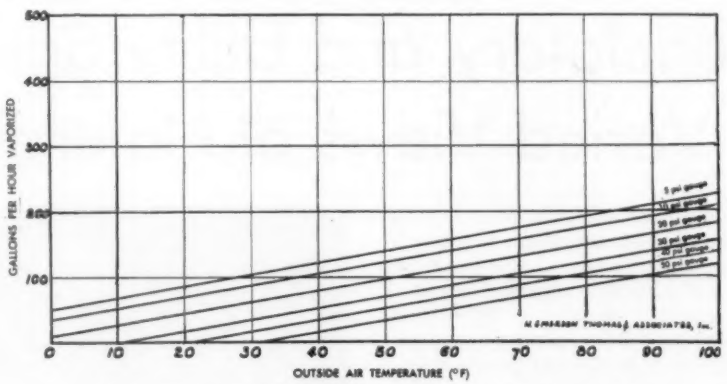
Referring to standard table of thermodynamic properties of propane; temperature at 10 psi ga is —20° F; and the latent heat of vaporization is 750 Btu per gal.

From the above formula—

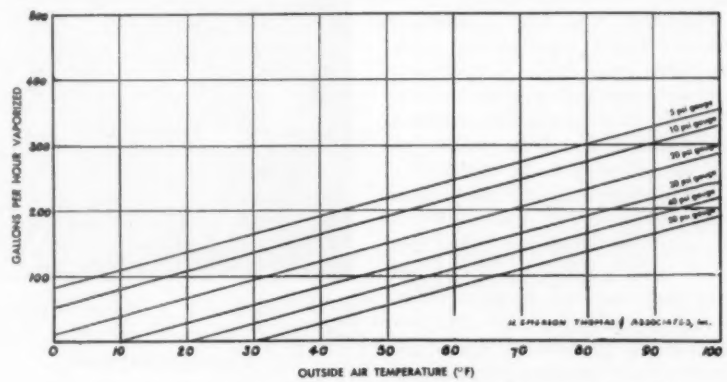
$$\frac{2 \text{ Btu} \times (80^\circ\text{F} - (20^\circ\text{F})) \times 1014 \text{ sq ft}}{750 \text{ Btu per gal}} = 271 \text{ gal}$$

With the above conditions, we there-

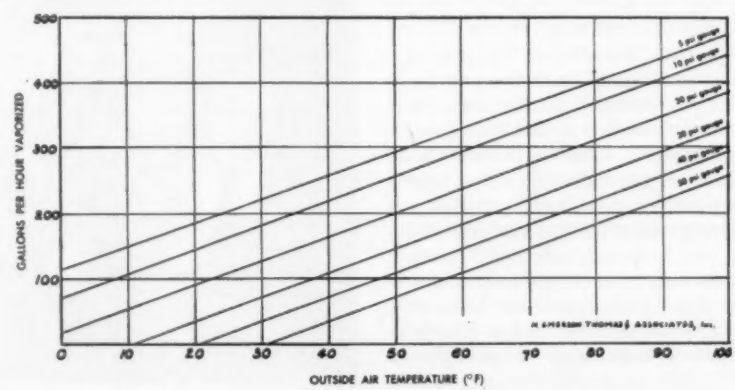
(Continued on page 46)



Vaporization in 30,000 gallon tank, ¼ full—662 sq. ft.



Vaporization in 30,000 gallon tank, ½ full—1,014 sq. ft.



Vaporization in 30,000 gallon tank, ¾ full—1,365 sq. ft.

Left to right: George F. Mitchell, Chicago; Frank H. Lerch, New York; Rock G. Taber, Atlanta; B. L. Maulsby, Rome.

Paul Kayser, Houston.

Harry K. Wrench, Minneapolis, left, and S. B. Severson, Buffalo.

Olin Culberson, Austin, Tex.

Left to right: Robert A. Hornby, San Francisco; J French Robinson, Cleveland; Arthur F. Bridge, Los Angeles.

Regulatory and Utility Spokesmen Express Varied Views at Natural Gas Meeting

THE marked conflict in views between those who see natural gas as primarily an asset to lure industry to the producing state, and those who regard it first of all as an essential element in the national economy was presented to the delegates and visitors at the natural gas meeting of the American Gas Association held in Dallas, May 7 and 8.

Proponent of the economic state's right viewpoint was Olin Culberson, chairman of the Texas Railroad Commission, who said that, "Tremendous withdrawal of our gas supplies in Texas pose a threat to our continued industrial growth." "This danger," the speaker asserted, "far outweighs the profit that comes to the comparatively few producers of gas and owners of royalties."

In a paper that might well have been calculated to allay the fears of commissioner Culberson, Paul Kayser, fellow Texan and president of the El Paso Natural Gas Co., pointed out that: "The proved reserves of natural gas will support the present rate of production in this country for a period in excess of 26 years, but the rate of discovery of reserves exceeds consumption, on the average, by more than double the consumption . . . so long as this trend continues there is no occasion to be concerned about the exhaustion of the reserves."

Mr. Kayser's conclusion was that: "The natural gas industry in developing and expanding as it has is building a more stable and efficient economy for the use of our national resources," through the financing, construction and amortization of long distance pipe lines that may at a future date be used to transport the synthetic fuels made from coal and shale.

D. A. Hulcy, AGA president and head of the Lone Star Gas Co., and F. H. Lerch, Jr., president of Consolidated Natural Gas Co., New York, both spoke against increasing government incursions into the affairs of private industry, Mr. Hulcy warning that a national fuel policy, promulgated and managed under a political economy, would end in disaster.

AGA President D. A. Hulcy, at left, chats with C. E. Bennett, chairman, Natural Gas Department.

H. A. Rhodes, Houston, at left, and A. B. Lauderbaugh, Pittsburgh.

Mr. Lurch condemned the vanishing rate base principle of the Federal Power Commission, under which he said the time would come when no return on investment would be allowed in the rates fixed for utilities under FPC regulation. He also pointed out the inconsistencies of overlapping state and federal jurisdiction with the resulting high accounting and other costs that must be borne by the gas consumers.

A paper prepared by Bruce K. Brown, deputy administrator of the Petroleum Administration for Defense, was read by William S. Tarver, PAD attorney. Foreseeing a shortage of steel pipe, Mr. Brown said: "It appears that the total supply of pipe available in the months ahead is likely to equal less than two-thirds of the planned usage by gas and oil companies," and the supply of large diameter transmission pipe will add up to less than half of the amount needed before winter to finish pipe lines already under construction.

As is usual in natural gas meetings, a considerable portion of the program was devoted to the technical aspects of pipe line operation, with papers on: the gas turbine for line pumping; right of way maintenance; radio communications and natural gas storage.

The time and place for the 1952 meeting was tentatively set for Los Angeles, on May 12 and 13, 1952. C. E. Bennett, chairman of the Natural Gas Department, and second vice-president of AGA, presided at the general sessions.

Flash Tube Ignition Has Advantages To Keep 'Gas Ranges Gas'

by C. S. Hazel

The Philadelphia Gas Works

AUTOMATIC lighting of top burners of gas ranges for 20 years has not only been perfected and accepted, but has been demanded by the lady of the house as standard equipment on all ranges. In addition, the gas range rules supreme in speed, flexibility, economy and in many other respects. However, the inherent advantages of cooking with gas will not stand up much longer against competitive forces—unless the gas range is made the finest fully automatic cooking appliance.

This discussion deals with automatic ignition of the oven and the broiler; and in this respect the ignition story has been quite different from that of automatic ignition of top burners. In fact, on the large majority of ranges sold today, ignition of the oven and broiler is not much further advanced since the Gay Nineties. The range, generally speaking, is the only major gas appliance which depends on match-lighting of its burners; yet the range, which is the bread-and-butter load of the industry, remains only partially developed from the standpoint of fully automatic ignition.

Only a small percentage of the ranges sold in this country today are of the fully automatic type, with either separate gas pilots or electric ignition in the ovens. Even here, it is recognized by many in the industry that the performance of present oven ignition devices, even in CP ranges, leaves much room for improvement.

Flash Tube Ignition—A "Natural" for CP Program

We must recognize that promoting and selling fully automatic gas ranges, built to CP standards, is an essential part of the promotion program of the gas industry. Of the specific points of advantage of CP ranges, those pertaining to oven and broiler ignition have been, I believe, of the greatest interest to the industry.

There was a time when the ignition of the entire gas range from only a single pilot was a fantastic idea and nothing more than a hope that someday this fond dream might be realized. Such an ignition system is considered essential by many gas utility men to permit the full and unhampered development of the CP program, and to provide the gas industry with a range that would meet every competitive situation.

Such an ignition system would be an improvement over existing systems, through the elimination of the use of a strongly competitive service for performing an essential function in the operation of the gas range, as in the case of electric ignition; and in the case of present forms of gas ignition, by the reduction of multiple pilots to but a single pilot. Such are the basic advantages of flash tube ignition. More specifically stated, the essential advantages are as follows:

ADVANTAGES OVER ELECTRIC IGNITION

1. Retention of pilot load and pilot revenue. Since gas customers everywhere accept the top pilot on a gas range without question, there seems to be no more reason for passing up this valuable load to our electric competitor. (At first glance, this load may seem insignificant but, after calculating the entire range pilot load in your company, its size will be surprisingly large. This load, of course, represents the perfect load factor.) Studies show that passing up the range pilot load to electric ignition is the equivalent of losing 12 per cent to 24 per cent of the cooking load *and consequently losing the revenue derived from this load,* depending on whether the range would have one or two pilots. With knowledge of these facts, it seems doubtful that any utility would deliberately want to pass up the pilot load, especially the straight gas utility.
2. Elimination of the competitive aspects of using the service of our most serious competitor.
3. An installed first cost of not more than two-thirds that of electric ignition, possibly one-half of electric.
4. Elimination of the necessity of creating an electric outlet every time a modern gas range is sold, involving an electrical contractor, permit and inspection.
5. Lower cost of installation, through the elimination of the electric outlet.
6. Elimination of the possibility that gas utilities, through union requirements, may have to call upon the services of private electric appliance service organizations to service gas ranges equipped with electric ignition.
7. Lower servicing costs. The complexity of the electric hook-up and other gadgets necessary to accomplish automatic electric ignition bring into the picture a more costly servicing problem which is the phase of operating that the industry is going all-out to avoid.

ADVANTAGES OVER MULTI-POINT GAS IGNITION

1. Eliminates extra pilots and their extra operating costs. The elimination of extra pilots has an economy appeal to the customers. Furthermore, customer acceptance of top burner pilots has been well established, but additional pilots, located in the ovens, have been received critically by the public.
2. Eliminates hot, unused ovens by eliminating constant burning pilots in the ovens. The customer is dissatisfied with the "hot oven" in which the constant burning pilot is located. The immediate effect of sensing the increased temperature in the unused oven, even though the pilot consumption is small, is that the customer assumes that cost and waste are involved.
3. Eliminates hot kitchens resulting from several pilots. Similarly, when the customer senses the additional heat in a confined kitchen from the several burning pilots, the reaction is unfavorable to the gas range.

Now Satisfactory on Natural Gas

About four hundred ranges with single point flash tube ignition have been in service from five to seven years on manufactured gas. From the standpoint of flashing gas from the top pilot to the oven and broiler burners on manufactured gas, these ranges have been operating satisfactorily and have proved very practical.

There were many in the industry who felt that flashing would be practical and satisfactory on manufactured gas but who said it would not be practical on straight natural gas or mixed gases of high methane content. However, thanks to the effort of several valve manufac-

Presented at AGA Research & Utilization Conference, Cleveland, May, 1951.

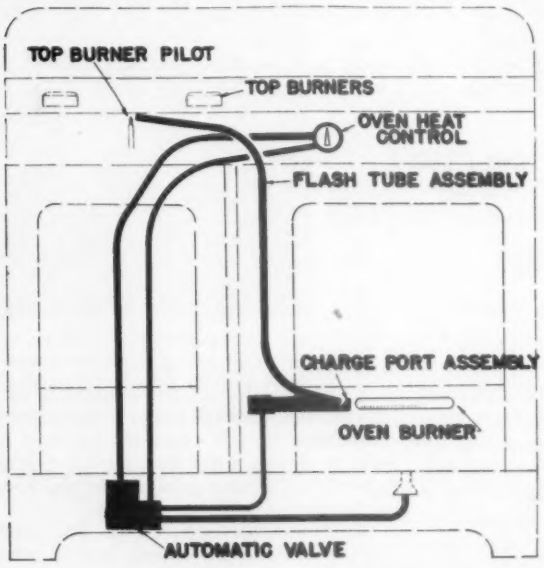


Fig. 1—Flash tube ignition system compactly installed for range oven.

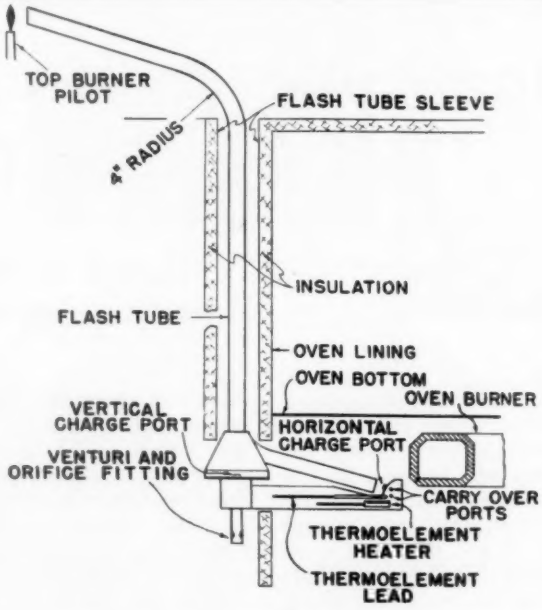


Fig. 2—One bend, two step system.

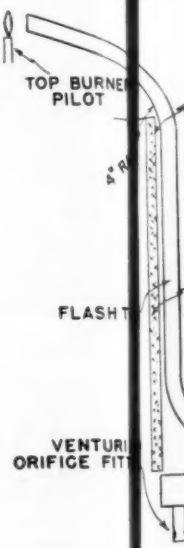


Fig. 3—

turers, the right key has been found to open the door to successful flashing of straight natural gas. I am referring, of course, to the new type of oven valve that has been developed in the past year, which has made flash tube ignition on straight natural or high methane gases to ovens and broilers as simple as it is on manufactured gases containing high hydrogen.

It is now true that a system properly designed for natural gas can be used with equally satisfactory results on manufactured gas; the only difference is in the size of the orifice which supplies gas to the flash tube. This change, of course, is necessary on any gas burner that may be used interchangeably on both gases. The design, therefore, is simplified from the range manufacturer's standpoint in that the same system can be built into every range that flows down the assembly line, regardless of the kind of gas that will eventually be used on that range (except LP gases).

This, plus the fact that the industry is now within sight of land of being able to turn out valves on a mass production basis, should naturally reflect in a lower overall installation cost of flash tube ignition in CP ranges.

Approach to the 'Cold Range' Idea

We have heard a great deal about the "cold range" in the past year, and the nearest approach to date to the "cold range," other than through the use of complete electric ignition, was that displayed by Roper at the AGA convention last year. Their "Mystery Range" has a small permanent gas pilot concealed in the backrail in such a way that no heat was apparent to anyone examining the range. All surfaces and working parts were entirely cold, and gave the same effect to the customer as an electric range when connected but not in operation. Connected to the concealed pilot in the backrail were several flash tubes; two led to the normal pilots under the working top of the Roper staggered-top range, and each pilot supplied two burners; another flash tube led directly to the oven burner; and another flash tube to the separate broiler burner.

When a top burner was turned on, the burner pilot under the cooking top was ignited almost instantly by the concealed pilot in the backrail, and this working top pilot ignited one or more of the top burners. When all of the top burners were turned off, then the pilots under the working top also were extinguished. The operation of the oven burners was the same; when the oven burner was turned on, the gas flashed through an ignition tube from the concealed pilot in the backrail and lighted a pilot adjacent to the oven burner, that in turn actuated the thermostatic device, and released gas to the oven burner. Of course, the oven burner pilot was also extinguished when the burner was turned off.

Design of Flash Tube Systems

Fig. 1 shows how the flash tube ignition system for an oven fits compactly into a range without the customer being aware of its presence, and without occupying space which could be utilized more advantageously. The flash tube assembly is embedded in insulation in the

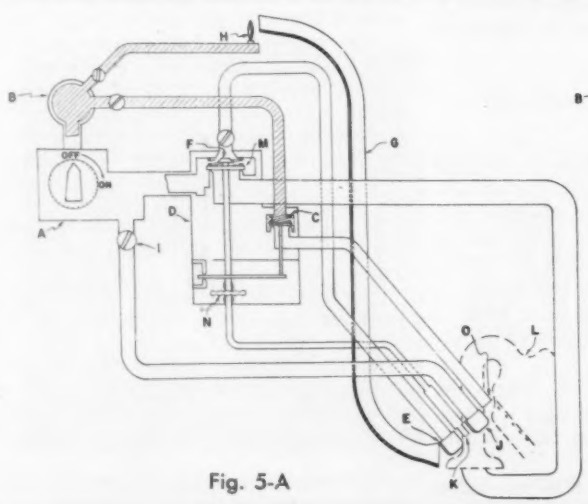


Fig. 5-A

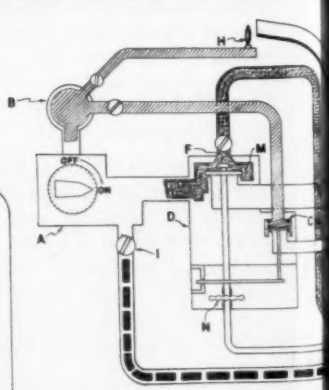
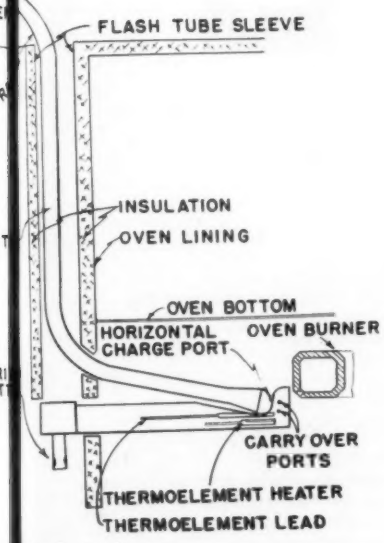


Fig. 5-



bend, single step system.

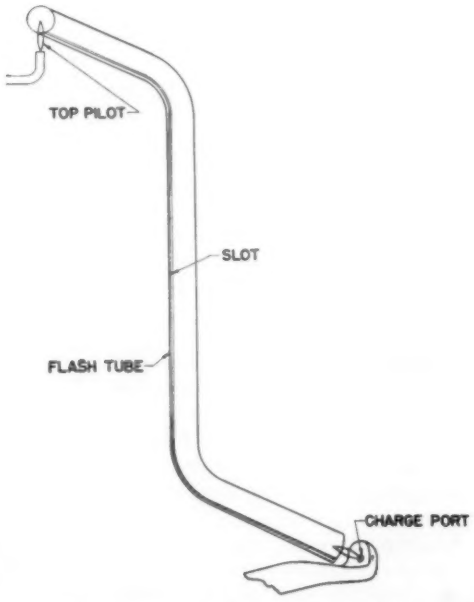


Fig. 4—Two bend single step flash tubes showing location of slot.

oven side wall with the lower end of the tube terminating just above the charge port assembly. In addition to the flash port, that assembly includes the air mixer, the thermal element, the thermal heater port and the standby pilot. The automatic valve is concealed in a spot in the range that is not useful for any other purpose, yet it can be made readily accessible.

The only manipulation required is that of turning on the oven heat control valve. The gas then flows through a passage in the automatic valve to the flash port and to the heating port for the thermal element. The gas mixture injected into the lower end of the flash tube flows upward, filling the tube with a combustible mixture which upon reaching the end of the tube is ignited by the top burner pilot and flashes down into the flash tube. Within a second, the flame has arrived at and ignited the gas at the flash port and thermal element heating port. The thermal element within a few seconds has had sufficient heat applied to open the automatic valve which permits gas to flow to the oven burner and at the same time shuts off the flash tube gas. The oven burner ignites from the thermal element heating flame. Where a separate broiler is used, the operation of lighting is identical except that an ordinary oven burner valve replaces the oven heat control.

Only two fundamental features are basic to the design of flash tube ignition systems. These features are:

1. A slotted flash tube.
2. An automatic oven control valve capable of shutting off gas to the flash tube at the time the oven burner is ignited.

Slotted Flash Tube

The slotted flash tube is the most satisfactory design for universal use on all types of gases, primarily because of the slow burning characteristics of high methane gases. The slot assures positive flashing through a wider variation of input to the flash tube and wider pressure variation than would otherwise be possible with a solid wall tube.

Positive flashing is assured, even with a relatively rich mixture at the charge port, due to the fact that along the slot there is a range of gas-air mixtures that are "ripe" for combustion, and this is the principal reason for reliable flame propagation from the top pilot to the oven or

SCHEMATIC DIAGRAMS OF THE NEW AUTOMATIC OVEN VALVE SHOWING VARIOUS STAGES OF OPERATION

Fig. 5-A—Oven Heat Control Valve A in off position—Burner rail pressure B as for as **Standby Valve C in Automatic Valve D.**

Fig. 5-B—Oven Heat Control Valve A in on position—Gas burning at **Flash Port E** after passing through **Flash Gas Valve F.** Gas from **Flash Port E** is ignited from **Top Pilot H** after flashing through **Flash Tube G.** Gas from oven heat control **Bypass I** burning at **Thermal Heater Port J.** This gas is ignited from **Flash Port E. Thermal Element K** is heated from **Heater Port J.**

Fig. 5-C—Oven Heat Control Valve A in on position—Gas burning at **Oven Burner L,** receiving its supply through **Valve M.** Gas burning at **Standby Burner O** receiving its supply from **Standby Valve C.** Both burners (L and O) receiving gas as result of action of heat from **Thermal Heater Port J** on **Thermal Element K and N.**

Fig. 5-D—Oven Heat Control Valve A in off position—and before **Valves C** and **M** close from action of **Thermal Element K-N.** Gas burning at **Standby Burner O** for quick re-ignition, if necessary, of **Oven Burner L.**

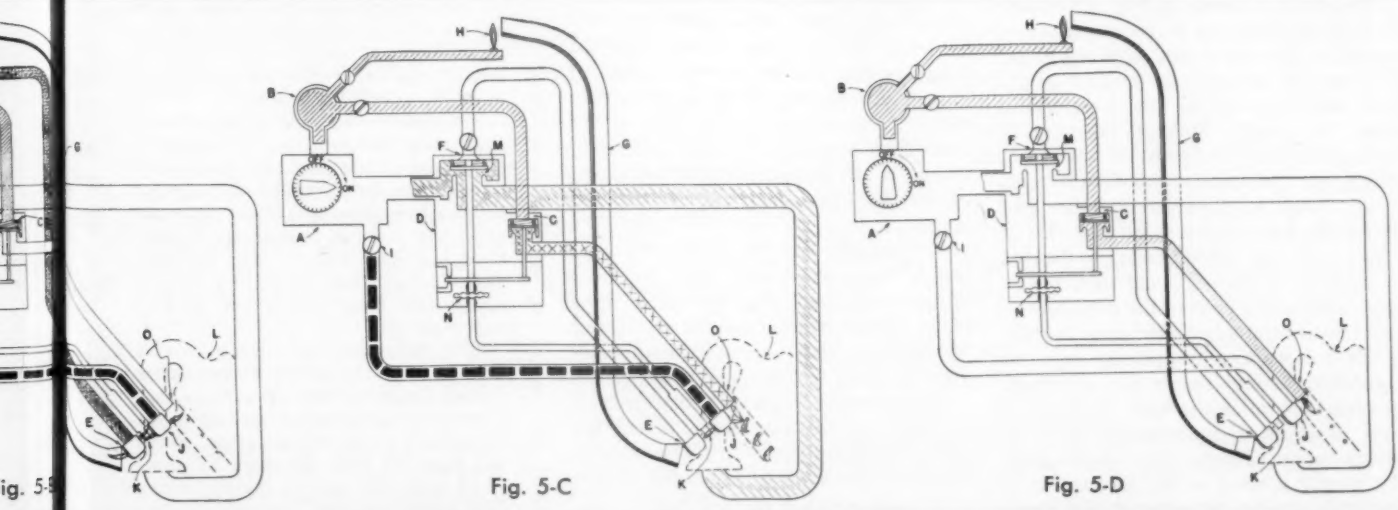


Fig. 5-C

Fig. 5-D

broiler burner. That portion of the slotted tube imbedded in insulation must be surrounded with a sleeve and it is recommended that the minimum clearance between the flash tube and the sleeve, along the line of the slot, be ¼". Otherwise a slotted tube imbedded in insulation becomes in effect a solid wall tube and, of course, the flexibility of flashing slow burning gases would diminish.

Flashing straight natural gas or mixed gases of high methane content requires a higher Btu input for a given tube diameter than for manufactured gas. In fact, best results are obtained with high methane gases when the flash tube is overgassed. With a properly designed tube, overgassing assures reliable flashing over a wider range of pressure variation as well as over the complete range of oven temperatures. This condition makes it desirable to shut off the flash gas as the oven burner comes on and to keep flash gas off during oven operation. There is no hazard involved with overgassing of the flash tube even if the flash gas were not shut off because of the relatively small flow of gas, usually not more than two or three cu. ft. per hour of straight natural gas. However, the flash tube is overgassed for only a few seconds during the interval required by the newly-designed automatic oven valve to open from the action of the thermal element and admit gas to the oven burner. This valve functions to shut off flash gas simultaneously as the oven burner comes on.

There are several designs of slotted tubes in use involving both round and rectangular cross sections. It is our opinion that flash tubes with even greater flexibility of operation are possible through further development work.

In attempting to translate research and experimental data into practical flash tube designs, two general arrangements of flash tubes have been used successfully.

One Bend—Two Step System

This system, shown in Fig. 2, consists in flashing from the constantly-burning top pilot, through a tube with one bend, to a vertical charge port located in the oven wall just outside the oven. Then, from this point, flashing takes place through a short tube to a horizontal charge port adjacent to the oven burner.

The small combustion chamber just above the vertical charge port, shown in Fig. 2 as a cone-shaped fitting, is located at the base of the one-bend tube with a side outlet at the apex of the cone for the short horizontal tube to the oven burner. While this entire arrangement may be considered as involving a two-step flash, in actual operation the flash for all practical purposes is simultaneous to both charge ports. This is accomplished by the proper placing of the side outlet in the cone, and utilization of the flame traveling down the vertical flash tube, to ignite the charge coming through what has been referred to above as the horizontal tube.

This type of flash system lends itself to an almost completely concealed installation in the range, the vertical portion of the tube and the cone-shaped combustion chamber being inserted inside a sleeve within the oven lining. Therefore, the only exposed portions are those which extend from the oven lining to the oven burner and in the top burner box.

Two Bend—Single Step System

This system, shown in Fig. 3, consists of a single tube with two bends which flashes gas in a single step from the top pilot to a charge port adjacent to the oven burner. It offers an advantage over a one-bend system for the following reasons:

1. Intermediate pilots, flash tubes and trailer ports are eliminated;
2. All flames are confined to a point inside the oven;
3. The construction is simplified and is also less expensive;
4. The flash tube is concealed more readily.

Fig. 4 is a sketch of a two bend-single step system showing in more detail the slot and relation between the charge port and flash tube.

New Automatic Oven Valve Features

The fact that it is desirable to shut off the flash gas as the oven burner comes on as previously indicated, requires a special type of valve that has never been used by the gas industry, and this is the one phase of flash tube ignition that has taken some time to develop. However, several manufacturers have now developed valves that will perform all the desired functions of flash tube ignition. This new type of valve serves a threefold purpose, as follows:

1. Acts as an ordinary safety shut-off valve and permits gas to flow to the oven burner only if the oven ignition pilot is burning. (In this case it is usually the flame used to heat the thermal element.)
2. Controls the gas for flashing purposes by permitting gas to flow to the flash tube system only when the oven burner is off, and automatically shutting off the flash gas when the oven burner comes on.
3. Provides gas for a standby pilot which burns from the time the oven burner is ignited until the oven valve closes automatically from the action that results when the thermal element cools after the oven burner valve is turned off.

This standby pilot is a convenience feature for the houswife in event she shuts off the burner and, a few seconds later, decides to turn it on again before

(Continued on page 45)

American Gas Fundamentals

OUTLINE

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1. Geology
2. Drilling and Production

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1. Coke oven gas; producer gas, blue gas; carbureted water gas
2. Reformed gas
3. Hi-Btu oil gas

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2. Corrosion and pipe protection
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Measurement by Positive Displacement

THERE are two basic methods used in the measurement of gas. First, through the positive displacement meter; and, second, through the inferential type meter, such as the orifice meter. In a gas distribution system, practically all gas is measured with a displacement type meter, so, in this chapter only the positive displacement meter will be discussed.

With the gas meter, such as is used in domestic gas measurement and with which many people are familiar, external power cannot be furnished to operate the meter mechanism. It is necessary, therefore, to use some of the potential energy which the gas itself possesses (in the form of pressure) to supply the motivating power. There must be some available energy in the gas itself before it can be measured with the ordinary meter. The basic meter must accomplish three things: First, provide a means for driving the volume displacement members continuously; second, control the displacement per revolution as accurately as possible; third, afford some means for counting the revolutions and expressing this result as cubic feet of gas.

With few exceptions, the meter arrived at for measurement of gas by the displacement principle is one which uses leather diaphragms and slide valves. (Fig. I illustrates how the pressure of the gas is utilized to cause displacement by means of the diaphragm movement.) For reasons which will be discussed later, the conventional meter has two diaphragms and two sets of valves to control the flow. In the illustration, four diaphragm and valve positions of the meter are shown.

Operation of Diaphragm and Valves

In illustration "A," of Fig. I, the left, or case, compartment of the left diaphragm is connected through to the valve to the outlet. The right, or diaphragm, compartment of this same diaphragm is connected to the inlet. The right hand diaphragm is at its extreme inward stroke, and the valve port openings to either side of this diaphragm are closed by the valve. When a valve to an appliance on the outlet side of the meter is opened, the pressure in the line will start to decrease and will reduce the pressure in the meter chamber, which is connected to this line. The pressure on the opposite side of the diaphragm will remain at the initial pressure; therefore, due to the unbalance in pressure or pressure differential, the left diaphragm will start to move to the left. The gas in the left case will move out through the exhaust port of the valve. This flow will continue until the diaphragm reaches its extreme left position; and, at the same time, the valve controlling this side of the meter will be moved by suitable mechanism so that the inlet and exhaust ports are both closed. The right diaphragm is connected to the left diaphragm by a crank linkage, so this diaphragm is moved off its dead center or extreme stroke, and eventually moves to position "B."

In the second position, the right diaphragm has moved to its mid-position. The valve connects the inlet pressure to the left or diaphragm chamber, and connects the exhaust, or lower pressure side, to the right or case chamber. The right diaphragm then does the driving and moves toward the right. ("C" shows a later diaphragm position, and "D" a still later one.) Each position can be analyzed as above. When the cycle is complete, it is obvious that the volume of gas which has passed from the inlet to the outlet is equal to the displacement caused by moving each dia-

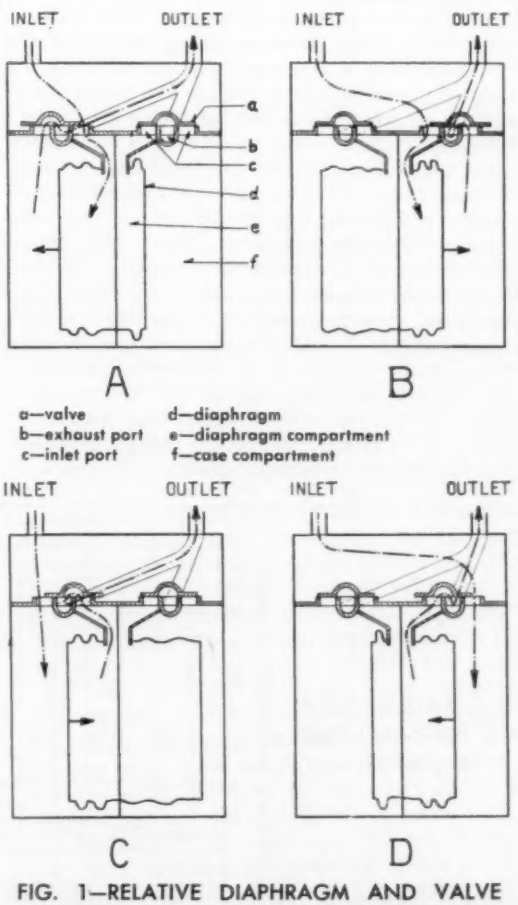


FIG. 1—RELATIVE DIAPHRAGM AND VALVE POSITION IN A DIAPHRAGM TYPE GAS METER.

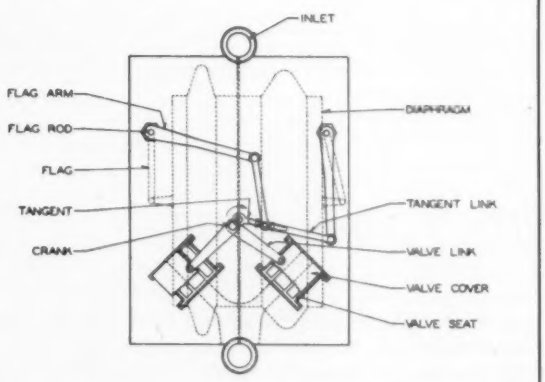


FIG. 2—CONNECTING DIAPHRAGMS AND VALVES.

phragm from one extreme position to the other extreme and back to the original position. By mechanically limiting the length of the diaphragm movements of the two diaphragms, it is theoretically possible to obtain a definite quantity for each revolution. A suitable revolution counter can then be geared to give a totalized amount of gas in cubic feet which has passed through the meter.

The problem of connecting the diaphragm to the valves which control it and to the opposite diaphragm can be met in many ways. A common method is shown in Fig. 2. The top of the meter, where the gas enters and the valves operate, is separated from the diaphragm chambers by a partition. (The parts shown in dash lines are located below this table partition, while the solid lines indicate the mechanism above the table partition.) Movement of the diaphragm will actuate a lever called the flag, causing the flag rod to rotate through an arc. The oscillating movement of the flag rod is transmitted to a rotating central post called the crank by means of a four bar linkage. Referring to the figure, these parts are called the flag arm, tangent link, and tangent. It will be noted that both diaphragms are linked to the same crank, so that the movement of one diaphragm will also cause movement of the other diaphragm. The linkage is so designed that when one diaphragm is in its extreme stroke, the other diaphragm will be in approximately its mid-position.

The same crank that is rotated by the diaphragms through the tangent drives the links which control the valve positions. It so happens that with a simple crank, having the same throw for each valve, the valve seats must be located 90 degrees apart in order to properly synchronize the correct valve positions with corresponding diaphragm positions.

If only one diaphragm were used in a meter, there would be a possibility of the gas being turned off when the diaphragm was at its extreme position and the valve cover closing the ports to both sides of the diaphragm. Under these conditions, when the gas was again turned on, the meter would not operate since it would be impossible to create a pressure differential across the diaphragm. By using two diaphragms which are linked together (as shown in Fig. 2) this condition would not be possible because when one diaphragm is at its extreme stroke the other diaphragm must be near its mid-position. Under the two-diaphragm system, one of the four chambers must always be open to the exhaust or outlet line; and, at the same time, the chamber on the opposite side of the diaphragms will be open to the inlet gas.

The principle, then, of a simple displacement gas meter provides two displacing meters called "diaphragms" which move back and forth with valves operating simultaneously to control the gas flow. The valve will first connect one side of the diaphragm to the inlet line and the opposite side to the outlet line, then reversing the connections so that the diaphragms will move in the opposite direction. There must always be a slight drop in pressure across the meter to overcome friction and cause this movement.

The primary purpose of the meter is to measure the gas, so it is apparent that the magnitude of the diaphragm displacement is important. Each diaphragm must "sweep through" a very definite and controlled volume. In general, the movement of the diaphragm is controlled by the length of the tangent (as shown in Fig. 2) but other factors must be considered to insure consistently accurate displacement.

There must be no leakage between the inlet and outlet connections. This means that the flexible diaphragms must remain free of holes and that packings, such as around the flag rod, must not leak. The valves must fit perfectly so that no gas can pass except through the proper passages.

The meter diaphragms must not only be leak tight but must also be very easily moved so as not to absorb too much pressure. All displacement meters at the present time use a displacement member which is made by a disc,

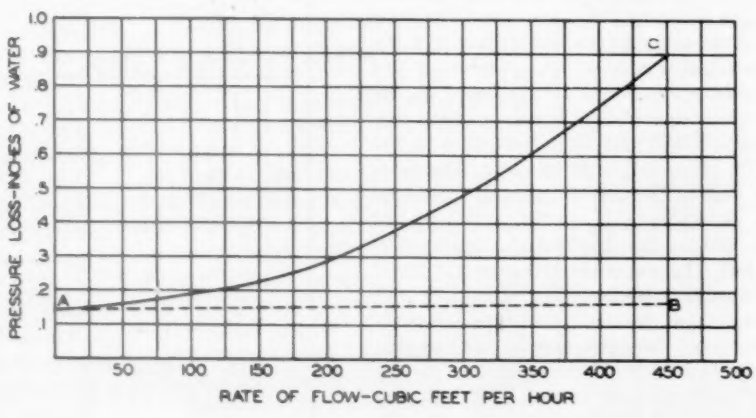


FIG. 3—RATE OF FLOW AND PRESSURE DROP IN METER.

moving back and forth, connected to the fixed portion of the meter case by a flexible oiled sheepskin or synthetic fabric. The disc and flexible member may take various forms, depending on the design. The total displacement is caused by the displacement due to the stroke of the disc, plus the displacement of the flexible member. A meter is designed so that a maximum amount of the displacement is caused by the disc, because it is much less likely to change than is the displacement due to the sheepskin or fabric.

The length of the tangent (see Fig. 2) controls the travel of the diaphragm. A longer tangent will cause greater diaphragm stroke, and it is by this means that meter accuracy is adjusted. It is obviously very necessary that the linkage between the tangent and the diaphragm disc be strong enough so as not to deflect due to the load transmitted.

In actual practice, there is a certain amount of deflection in the parts which control the diaphragm stroke. It is also necessary to have some clearance at all the bearing points to permit the parts to work freely. The amount of deviation of the meter from accurate measurement depends on the wear in the parts, changes in the diaphragm material, and many other points.

Pressure Loss and Valve Timing

Two factors which are very important in a meter are the pressure loss and the valve timing. The accuracy of a meter is very dependent upon these two factors and should be thoroughly understood.

If a meter is tested at various rates of flow and the pressure drop across the meter is accurately measured, a curve could be plotted as shown in Fig. 3. It will be noted that as the flow approaches zero, the pressure loss approaches a definite value as indicated at "A." The pressure loss across the meter at very low flows represents the force necessary across the diaphragm to operate the meter. The amount of this force is dependent upon the diaphragm stiffness, friction at the pivot points in the linkage, stuffing box drag, and the force necessary to drag the valve covers over the valve seats. As the speed of the meter increases for the higher flows, this basic differential will also increase slightly in a linear manner—as shown by line "AB" in Fig. 3.

There is an additional pressure loss through the meter due to the gas passing through the various passages. This pressure loss is a dynamic loss which can be approximately stated by the formula:

$$Q = K\sqrt{\frac{h}{G}}$$

where Q = is the rate of flow
K = is a constant
h = is the pressure loss
G = is the specific gravity of the gas

This formula can be simply stated by saying that the pressure loss through a meter will vary as the square of the flow. The total pressure loss through the meter can be represented by line "AC".

Any variation in the pressure differential across the diaphragm will tend to move the diaphragm disc a different amount and thus cause the meter accuracy to change. For example, if an accumulation of dirt on the valve seat causes a greater drag on the linkage, the pressure differential across the diaphragm will increase, causing a slightly longer diaphragm stroke. This accumulation will cause the meter to register less gas than actually goes through it.

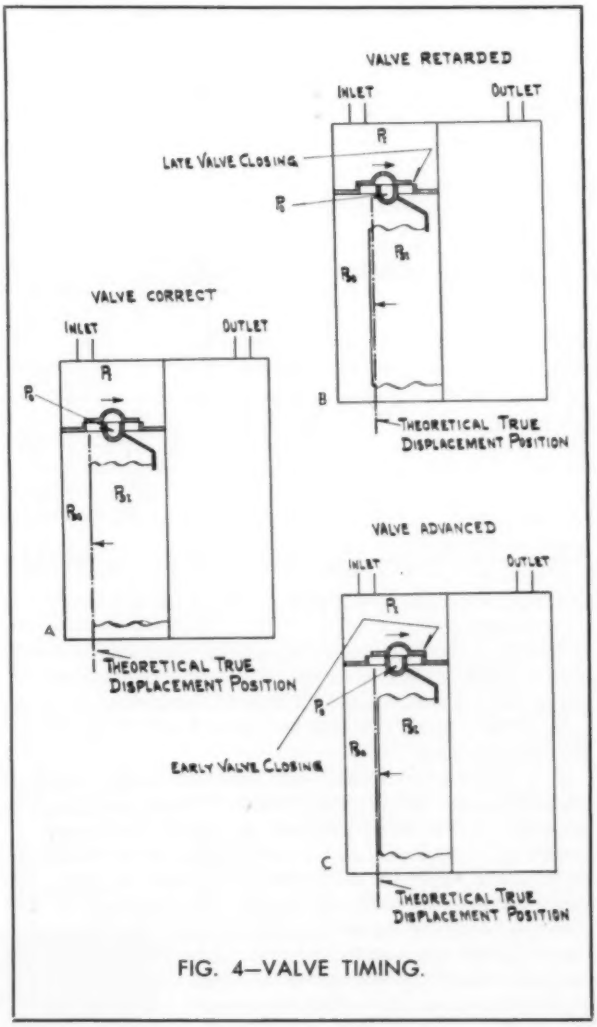


FIG. 4—VALVE TIMING.

In describing the operation of a meter, it was noted that the valve action must be synchronized with the diaphragm movement. It is necessary to use the valve timing as a means of making the meter displace the same amount of gas at low flows as it does at high rates of flow. Fig. 4, "A" indicates a meter having the correct valve timing with respect to the diaphragm, which results in a theoretically correct amount of diaphragm displacement. In Fig. 4, "B" the valve has been retarded so that the valve is still slightly open when the diaphragm reaches the end of its stroke. Under these conditions, the pressure inside the diaphragm "P_D" tends to equalize with the inlet pressure "P_I" and the pressure outside the diaphragm "P_{DO}" tends to equalize with the outlet pressure "P_O". At low rates of flow these pressures are already very nearly equal so that the pressure drop across the diaphragm will not change appreciably; and, therefore, the accuracy of the meter will not change. At high flow rates, this equalization of the pressures means a higher differential pressure across the diaphragm; and, therefore, more displacement. This, in turn,

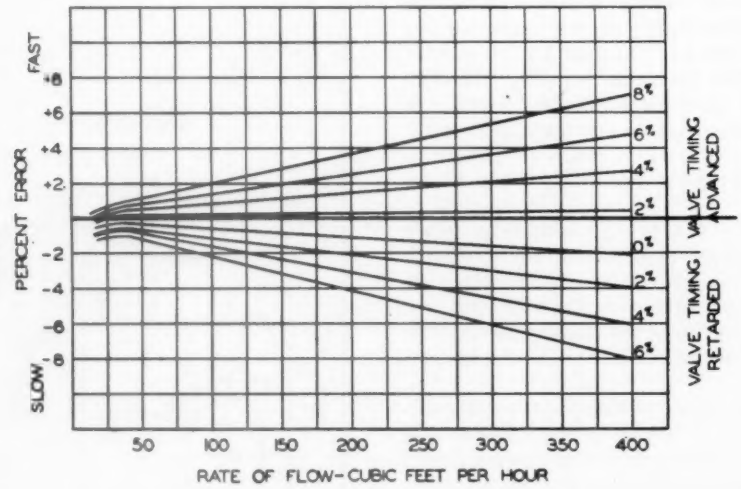


FIG. 5—CURVES SHOWING METER ACCURACY.

results in the meter being slow or displacing too much gas per revolution.

In Fig. 4, "C" the valves have been advanced and will close off the gas going to the chamber before the end of the stroke has been reached. This will again affect the high rates of flow more than the low flows and will cause the meter to be "fast."

It a meter was adjusted with different timing between the valves and the diaphragm, and for each position the accuracy of the meter checked at various flow rates, a family of curves could be plotted to indicate the results—as shown in Fig. 5. In the graph, the amount of valve advance or retard is stated in degrees. This is based on the crank driving the valves moving through 360°. An advance of two degrees means that the angle between the tangent controlling the valves has been changed by two degrees in a direction to cause the valve to move ahead of the diaphragm movement.

To obtain an accurate meter it is necessary to adjust the tangent length to obtain a correct displacement; and to insure the same accuracy at all rates of flow, it is necessary to have the relation between the valves and diaphragm adjusted.

Knowing these basic principles it is possible to predict what will happen to the accuracy of a meter under various field conditions. A meter will become "fast" if the diaphragm stiffens or shrinks. If friction is built into a new meter, it will speed up or become fast as it "wears in." Most factors will cause a meter to go "slow"—such as valve drag, wear, or deflection of the connecting links.

One of the important facts which must be recognized in the measurement of gas with a displacement meter is that the meter records only the volume or gas displacement. The Btu value of a gas is the real measurement of its worth. For this reason the cubic foot of gas sold must be defined or contracted at a certain pressure and temperature. Since the displacement meter only records the volume of gas at the conditions which exist in the meter, certain correction factors must be applied to the reading if the pressure and temperature of the gas is different from what is specified.

The laws governing the change in volume of a given amount or weight of gas with the pressure and temperature are Boyle's and Charles'.

Boyle's law states that at a constant temperature the volume of a given weight of gas will vary inversely proportionately with the absolute pressure of the gas. The absolute pressure means the atmospheric pressure plus the pressure recorded by the ordinary pressure gauge. For example, the atmospheric pressure at sea level is 14.7 lbs/sq in. If a pressure gauge on a tank indicated a pressure of 10 lbs/sq in, the absolute pressure in the tank would be 14.7 + 10 or 24.7 lbs/sq in.

By Boyle's law, if a piston in a cylinder compressed two cubic feet of gas at an absolute pressure of 20 lbs/sq in, and then the piston started compressing the gas until the absolute pressure increased to 40 lbs/sq in, the volume would have decreased to one cubic foot. As stated before, this is assuming that the temperature does not change.

Charles' law states that at a constant pressure the volume of a given amount of gas will vary directly proportional to the absolute temperature. The absolute temperature is 460 plus the reading of a thermometer graduated in degrees Fahrenheit.

The standard to which a gas volume is referred is called the base pressure and temperature. A common base used in this country is 14.65 lbs/sq in, and 60° F. The 14.65 lbs/sq in is obtained by considering an atmospheric pressure of 14.4 lbs/sq in and a four ounce gauge pressure.

Domestic meters used on low pressure distribution systems are not corrected for pressure or temperature. When displacement meters are used on higher pressures, a correction factor is applied to the metered volume. The temperature factor is often neglected and assumed to average 60° F over a period of time.

This discussion has necessarily left out many important factors in the selection and use of the proper meter, but a good understanding of the fundamental principles of the meter greatly simplifies the problem of obtaining accurate measurement.

This chapter on metering was prepared by H. J. Evans, Pittsburgh DuBois Division, Rockwell Manufacturing Company, DuBois, Penna.

Corporations Are Liable to Exact Terms Of Appliance Sales Contracts

by Leo T. Parker

Attorney at Law, Cincinnati

DURING recent months the higher courts in many states rendered outstanding decisions affecting gas corporations which sell and install gas appliances in private dwellings and industrial plants.

First, it is interesting to observe that a higher court in Willis, 190 S.W. (2d) 135, held:

"The sale of gas or electric appliances is properly incident to a gas or electric utility business, and therefore is not ultra vires, where the utility is incorporated."

Hence the validity of contracts for sale of gas appliances and other merchandise by gas corporations is well established.

Quite obviously, a gas corporation cannot enforce a sale contract for merchandise unless the higher court decides that the contract is legal and not in violation to modern laws. Consequently, considerable trouble and expense can be eliminated by those who may, by reference to a dependable rule, distinguish an invalid from a valid contract. This rule is: A contract is valid and enforceable if (1) one party submitted an offer which the other party unconditionally accepted in detail; (2) neither party deceived, misrepresented, or exerted unlawful influence with respect to the other party to obtain the contract; (3) both parties agreed absolutely to perform a definite act; (4) both parties were of legal age and of sound mind when the contract was made; (5) both parties had proper authority to make the contract; and (6) the objects of the contract were lawful and not against public policy.

Also, the law is well settled that either party may legally cancel any contract obtained by the other as a result of direct or indirect fraud, misrepresentation, coercion, undue influence, duress, threats, or where the contract is made by an employee without proper authority.

Contract May Be Rescinded

The principle of the law is firmly established that all parties to a valid contract are bound to fulfill the *precise* terms of the agreement. The instant one party fails in this respect he performs a legal breach, and the other party has choice of doing one of three things; (1) he may refuse to continue to perform his obligations of the contract and sue the other party for damages and profits equal to his financial loss resulting from the breach; (2) or, he may file suit and compel the other party to fulfill the exact terms of the agreement; (3) or, the parties may enter into negotiations and make a supplementary or compromising contract.

Kinds of Guarantees

Guarantees of the quality of appliances, merchandise, workmanship, service, and the like are a common source of legal controversy. Therefore, it is well that gas company officials know that guarantees are classified by the courts as "expressed" and "implied."

An "expressed" guarantee is one where the contracting parties orally or in writing agree to the *exact* quality of appliances, merchandise, workmanship, or service. An "implied" guarantee exists where the seller does not actually make a warranty, but the circumstances are such that a court will *imply* that a guarantee *should* exist. In other words, frequently an agreement is such that a purchaser is compelled to rely upon the honesty of the gas corporation or its salesman, and under these circumstances the courts imply a warranty on the part of the gas corporation that it will supply merchandise or equipment reasonably worth the price paid.

For example, in a late decision, Allied 35 S. E. (2d) 1801, the higher court held that a contractor or other sellers are duty bound to supply merchandise and perform work reasonably worth the contract price, although the contract contains no guarantee.

In Johnson Co. v. Nottke, 51 N.E. (2d) 594, it was shown that a building owner informed a seller that he knew nothing about gas equipment, and the seller examined the building and prepared plans and specifications for installation of the equipment. Then the building owner and the seller signed a contract for installation of a new heating system in the building. The system did not prove satisfactory and the building owner refused to pay the contract price.

In subsequent litigation the higher court decided that although the seller had not guaranteed the efficiency of the heating system yet he was liable on an "implied warranty" that the heating system would function reasonably efficiently, and was worth the contract price.

Another important point of law is that a gas corporation which fails to supply merchandise equal to either an expressed or implied guarantee stands a good chance of financial loss by refusing to take back the merchandise immediately

'JAKE' JONES RETIRES

Jacob B. "Jake" Jones (left) is presented tribute by Earl Smith, president of South Jersey Gas Co., as Mr. Jones retired from the gas industry. Well known and well liked in the industry for 53 years, Jake recently reached his 70th birthday and retired under South Jersey's retirement plan. He had been active in the management of the Bridgeton Gas Light Co. for many years and was its president when it was sold to South Jersey Gas Co. nearly a year ago.

New officers of Indiana Gas Association elected at annual meeting at French Lick include (left to right): Edward M. Hahn, president, Kokomo Gas and Fuel Co., new vice-president of the association; E. E. Linburg, president, Richmond Gas Corp., Richmond, new president; Clarence W. Goris, Northern Indiana Public Service Co., Gary, secretary-treasurer.

Indiana Gas Association Elects New Officers

and refund the contract price to the purchaser. This is so because the law states that if gas appliances or other merchandise does not conform with the terms of the contract, the purchaser has a legal right to return the merchandise to the seller, and recover the purchase price, plus all damages. If the purchaser offers to return the equipment and the seller refuses to accept the same, the purchaser may retain the equipment in his possession *at the risk* of and for the seller.

For illustration, in Economic Corp. v. Dillon Supply Co., 159 S.E. 78, the testimony showed that a corporation took from a purchaser a contract for 100 gas heaters. After the heaters were received, the purchaser discovered certain important defects and immediately wrote to the corporation and offered to return the defective heaters. The corporation refused to accept redelivery and the court was asked to decide whether the purchaser was liable for subsequent damage to the heaters while the same remained in his care. In holding the purchaser not liable, the court stated the following important law:

"The warranty was that if the heaters were not as represented, the defendant (corporation) would accept their return. The plaintiff (purchaser) fulfilled its duty by notifying the defendant (corporation) of the breach of the warranty and offering to return the heaters. The defendant declined to accept. The heaters were held thereafter at the risk of seller and subject to its order."

Thus, a property owner has a decided advantage over a gas corporation which sells gas appliances. If the appliance does not equal the quality expressed in the contract, or implied by a court, the purchaser may return the appliance and sue and recover from the gas corporation the full contract price *plus all damages* resulting from the breach. And if the gas corporation refuses to take back the appliance, the purchaser may file suit and hold the appliance at *risk* of the gas corporation.

Quite obviously, therefore, if a gas appliance does not comply with the terms of the contract, it is advisable for the gas corporation to take back and keep the equipment until termination of a suit, rather than to allow it to remain in possession of the buyer at risk of the corporation.

The fact must not be overlooked, however, that a gas corporation cannot be held liable for breach of a contract, unless the property owner or purchaser fully and conclusively proves his contentions that the corporation breached its contract.

For illustration, in Home, 41 Atl. (2d) 71, the higher court refused to hold a corporation liable for breach of a contract to install an efficient heating system. The property owner had two tenants to testify that their apartments were not well heated, but the higher court decided that this testimony did not prove conclusively that the corporation had breached its contract and refused to hold the corporation liable for a breach. Of course, if the property owner had proved by heating experts that the system was inefficient, it is probable that the jury would have held the corporation liable for a breach of the contract, and the higher court may have approved the verdict.

Where a property owner contends that a gas corporation breached a contract for installation of gas appliances, a jury may consider all testimony and render its verdict. Also, if the property owner sued for damages, the jury may estimate the damages and render its verdict accordingly.

For example, in Schultz v. Grand, 19 So. (2d) 862, a property owner sued for damages and proved by expert witnesses that the corporation breached its contract by installing inefficient gas appliances.

The jury held the corporation liable for $832 damages. The higher court approved the verdict.

It is interesting to know that the courts consistently hold that a property owner *always* is privileged to cancel a contract and recover damages if the gas corporation (1) fails to complete delivery of merchandise on an installation on the date specified in the contract, whether such contract is verbal or in writing; or (2) he fails to supply the agreed quantity or quality of appliances, materials, and workmanship; or (3) where the gas corporation fails in any other particular detail to fulfill the assumed obligations as specified in the contract.

Authority of Salesmen

Modern higher courts consistently hold that a gas corporation is not at all liable on a contract, statement or guarantee made by an ordinary salesman, unless and until a duly authorized corporation official accepts and approves the contract. Moreover a contract taken by an ordinary salesman or agent is not effective on the date the contract was signed by the salesman and purchaser. The effective date is when the gas corporation approved or accepted the contract.

For example, in the leading case of McCrea, 55 Atl. (2d) 564, the testimony showed that a property owner signed an agreement to purchase certain gas equipment. The property owner paid down a payment and the contract specified that delivery of the equipment was to begin in 30 to 60 days. This contract was signed July 2 in presence of a salesman of the corporation. On August 2 an official of the corporation sent a letter to the property owner approving the contract. The corporation had not started delivery and on September 23, the property owner wrote and cancelled the agreement. The corporation refused to cancel the contract and offered to start deliveries at once. The property owner refused to agree and attempted to recover the down payment, plus damages. The property owner contended that the corporation breached its contract by failing to start deliveries within 60 days after the contract was signed July 2.

The higher court held the corporation not liable because the contract was not approved until August 2, and that it was within the legal rights of the corporation to start deliveries within 60 days from August 2. The court said:

"The case turns on the effective date

(Continued on page 46)

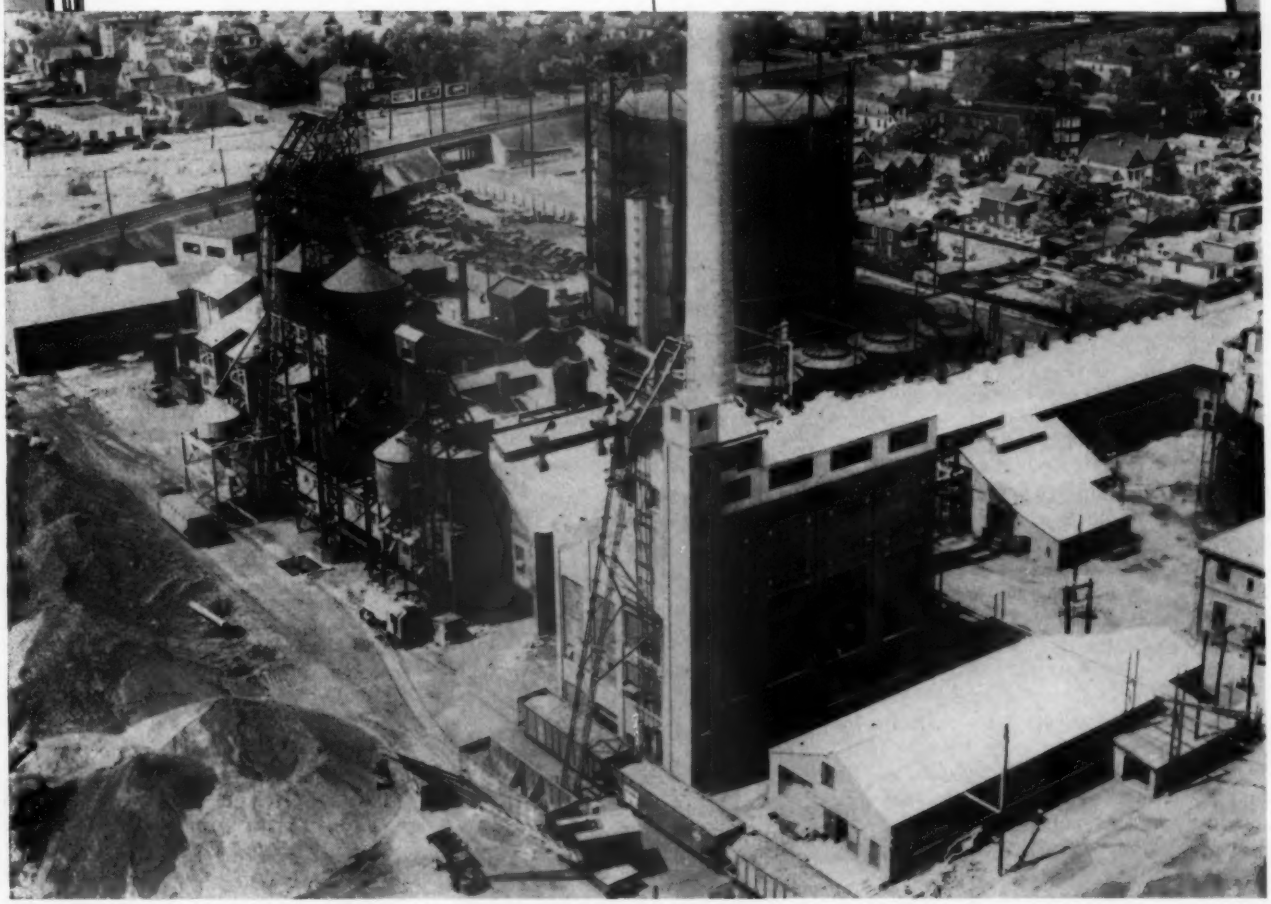
On the record

GASMACO'S

48 years' service

to

ELIZABETHTOWN CONSOLIDATED GAS CO.



The Gas Machinery Company's service to this utility began in 1903 . . . and extends to the present. Seven water gas sets top the list of equipment provided which includes blowers, condensers, scrubbers, purifiers, and many other items. Gasmaco service was a contributing factor in the progress and success of this enterprise.

This year natural gas came to Elizabeth, New Jersey, where this utility serves 120,000 consumers. The plant remains in service — as a control center for natural gas, and with Gasmaco oil gas processes for stand-by and peak shaving.

The record tells why the gas industry looks to Gasmaco for new services, new processes and new equipment.

Designers • Fabricators • Erectors
Gas Plant Equipment and Industrial Furnaces

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THE GAS MACHINERY COMPANY
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New Cooling Method Solves Old Problem At Long Island Reforming Plant

THE method of cooling reformed gas and gas compressors is among the features of the new gas reforming plant built recently by Long Island Lighting Co. The plant serves areas geared to the use of manufactured gas and reforms natural gas into a gas closely approximating that produced by the company's several water gas plants in the Long Island area.

The plant was built at Glenwood Landing on the North Shore of Long Island to serve Southeastern Queens county in New York City and suburban Nassau and Suffolk counties.

The gas is reformed by a catalytic cracking process utilizing equipment developed by Surface Combustion Co. Plant capacity is approximately 35,000,000 cu. ft. of natural gas per day. After cracking, the reformed gas is enriched, stored in a new 5,000,000 cu. ft. holder from which it is pumped out through the high pressure mains of the company's distribution system to consumers.

Cooling water problems are associated with both the reforming process and with gas compression for distribution. In both instances it is necessary to employ recirculatory, closed water systems because ground water is not available in sufficient volume for a once-through system and the unlimited volume of available sea water would create a serious salt corrosion problem if used directly in this way.

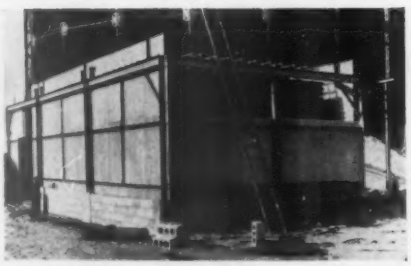


Fig. 1—Cooler for scrubbing liquor consists of three double banks of radiator sections inclosed by steel framed Transite walls.

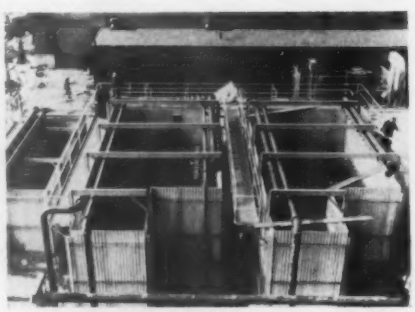


Fig. 2—Coolers for compressor and engine jacket water are cast iron. Compartment at left is for motor-driven compressors, and the other two compartments are for two gas engine-driven compressor units.

Dual Cooling Problem

The two basic cooling jobs are to cool the recirculating scrubbing liquor which cools and cleanses the finished gas, and to cool the fresh water that is circulated in the jackets of the gas compressors and their prime movers.

Reformed gas passes through a closed tower for a wet scrubber type of cleansing and cooling operation in intimate contact with sprayed water. This water picks up a large quantity of heat as well as residual impurities.

The equipment used for cooling all recirculated fresh water consists of built-up batteries of National Radiator Company's cast iron cooling sections over which salt water from Hempstead Harbor is sprayed. These cooling sections, being made of high grade cast iron, have high resistance to salt water corrosion and have proved economical in both first cost and maintenance, particularly when there are large quantities of process solution.

The coolers were designed for a minimum of evaporative cooling in order to avoid salt incrustation. They are placed close together and are surrounded by Transite walls which accomplish this and also prevent salt mist from being blown over other corrodable structures or equipment made of carbon steel. Fig. 1 shows the catch basin and steel-framed Transite enclosing structure just before completion.

The scrubbing liquor cooler is arranged in three parallel banks, each serving scrubbers for one of three Surface Combustion cracking furnaces. The three banks are interconnected in order to provide maximum operating flexibility. There are 418 sections in each bank which has two rows of sections in series, each row consisting of 11 parallel stacks, 19 sections high.

The combined cooler with 1254 sections was designed to cool 1800 gallons per minute of scrubbing liquor from 140 deg. F to 95 deg. F when supplied with 2325 gallons per minute of sea water at 70 deg. F.

Compressor Jacket Water

The cooling of water in the compressor and engine jacket system is similar to that for scrubbing liquor. Jacket water is circulated through closed systems and cooled by means of once-through salt water. Compressor jacket water must be kept within a temperature range of 113 to 90 deg. F in summer and engine jacket water must be kept within a temperature range of 162 to 150 deg. F.

There are five compressors. Two, which are driven by 2000 hp natural gas engines, are each provided with a cooler consisting of 256 sections arranged in 16 parallel stacks 16 sections high. They cool 550 gallons per minute of jacket water, using 633 gallons per minute of sea water at 70 deg. F.

Three compressors are electrically driven, one by a 2000 hp motor and two by 800 hp motors. The latter two units are cooled by 208 sections arranged in 13 parallel stacks, 16 sections high. These sections cool 630 gallons per minute of compressor jacket water from 113 to 90 deg. F using 550 gallons per minute of sea water.

Jacket water for the two gas engines, circulated at 1400 gallons per minute, is cooled by 11 parallel stacks 10 sections high. Sea water flows over these cooling sections at the rate of 420 gallons per minute to lower the temperature from 162 to 150 deg. F. As shown in Fig. 2, these coolers are inclosed with coolers for the compressors which they drive.

Dr. J. J. Wittmer, of Con-Edison, Dies Suddenly

Dr. J. J. Wittmer

John J. Wittmer, M.D., 55, a recognized authority in the field of industrial medicine, died of a heart attack on May 19 at his country home in New Canaan, Conn. He lived in Brooklyn. He was a vice-president of Consolidated Edison Co. of New York, and in charge of employee relations.

Doctor Wittmer was known nationally in industrial, medical and educational circles for his contention that employers and employees, working together, could solve much of the nation's health problem.

He joined Consolidated Edison system in 1924 as a staff physician, and advanced through such positions as supervising physician, medical director and personnel director until, in May 1950, he was elected a vice-president.

W. E. L. Irwin Elected President Of Pennsylvania Gas Ass'n

The Pennsylvania Gas Association held its annual meeting at Galen Hall, Wernersville, Pa., on May 15.

Officers elected were: W. E. L. Irwin, Philadelphia Electric Co., Ardmore, Pa., as president; Gordon M. Jones, United Gas Improvement Co., Philadelphia, as first vice-president; Andrew S. Morgan, Lancaster County Gas Co., Lancaster, Pa., as second vice-president; Edward G. Boyer, Philadelphia Electric Co., Philadelphia, as third vice-president; William Naile, Lebanon Valley Gas Co., Lebanon, Pa., as secretary; and James A. Schultz, Consumers Gas Co., Reading, Pa., as treasurer.

The meeting was addressed by Hon. David M. Walker, Secretary of Labor and Industry, and by Thomas S. Lever, retiring President of the Association, and vice-president of The Philadelphia Gas Works Co.

Rockwell Issues New Service Regulator Bulletin

A new bulletin on Rockwell service regulators has been issued by Rockwell Manufacturing Co. of Pittsburgh, Pa.

Rockwell service regulators types 107 and 173 are designed and built for domestic gas service and operate under high or low pressure, on manufactured or natural gas.

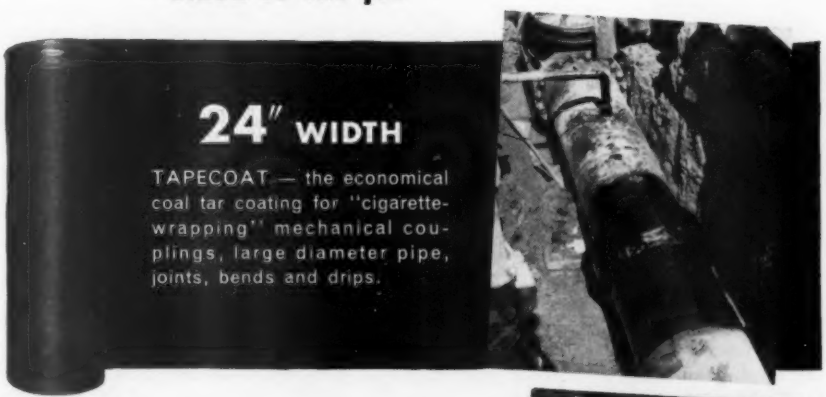
The new bulletin includes construction and performance information, as well as parts lists, accessories, etc. A copy may be obtained by writing Rockwell Manufacturing Co., 400 N. Lexington Ave., Pittsburgh 8, Pa., asking for Bulletin No. 1026.

CUT CORROSION PROBLEMS DOWN TO SIZE...

WITH TAPECOAT*

—the Coal Tar Coating in Handy Tape Form

—Sized to the job



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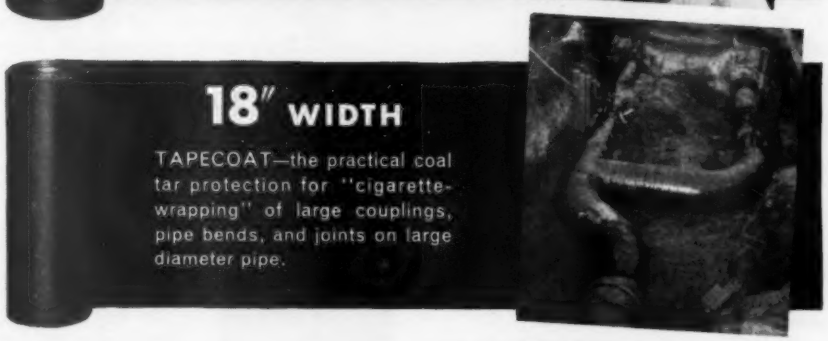
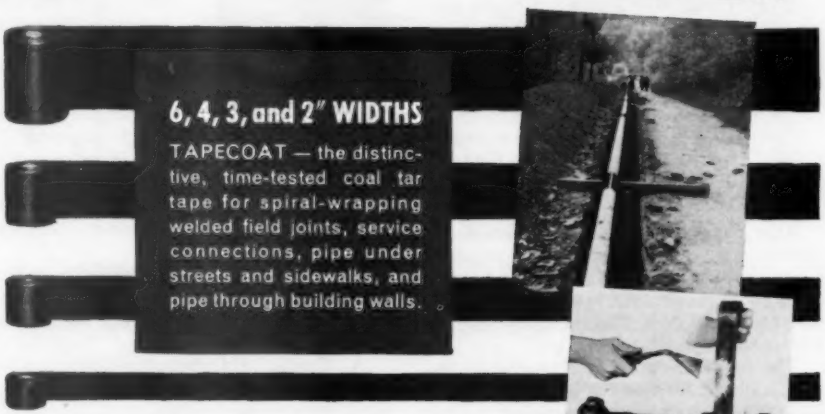
TAPECOAT — the economical coal tar coating for "cigarette-wrapping" mechanical couplings, large diameter pipe, joints, bends and drips.



18" WIDTH

TAPECOAT—the practical coal tar protection for "cigarette-wrapping" of large couplings, pipe bends, and joints on large diameter pipe.



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For more than 10 years, Tapecoat engineers have specialized in pipe joint protection. Call on them to help you meet your individual requirements. Write today for complete details.

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News of the Gas Industry

Engineering Personnel Shifts Are Made by Laclede Gas

Allen H. Burgess

The creation of the post of consulting engineer at Laclede Gas Co., Saint Louis, resulted in the appointment of Chief Engineer C. E. Schoene of the Laclede organization to that post, it was announced on May 1 by Robert W. Otto, president of the Laclede organization.

This appointment came at a time when other appointments and promotions were announced by the company. O. R. Allgeier was advanced to chief engineer to succeed Mr. Schoene. H. M. Gerken, former superintendent of the service and installation department, was made assistant to Mr. Schoene.

Allen H. Burgess, former district superintendent for the Oklahoma Natural Gas Co., was named general superintendent for Laclede. William M. Hawkins was named superintendent of the service and installation department, in which he had been assistant superintendent. Harrison Liebrum was selected to assist Mr. Hawkins.

E. F. Trunk was advanced to the post of development engineer, Robert E. Murray to load control engineer, and William H. Donnelly to assistant to the load control engineer.

FPC Authorizes Storage Field For Texas Gas Transmission

The Federal Power Commission has authorized Texas Gas Transmission Corp., Owensboro, to construct natural gas facilities necessary to connect and operate the Alford underground storage field near Petersburg, Ind.

The facilities, estimated to cost $938,-811, include 12 miles of connecting line, a 1200 hp gas compressor station, a storage measuring station, and 4.5 miles of storage field lines.

Texas Gas plans to connect and operate the Alford field as an integral part of its system. The company said that the construction will make available from storage a capacity of 30 million cu. ft. per day.

W. T. Stevenson Is Named President of Texas Gas

W. T. Stevenson has been elected president of Texas Gas Transmission Corp. J. H. Hillman, Jr., formerly president and chairman of the board, will continue as chairman of the board.

Mr. Stevenson has been executive vice-president and director of Texas Gas since the company was formed in 1948. He was also an officer and director of the two predecessor companies of Texas Gas—Kentucky Natural Gas Corp. and Memphis Natural Gas Co.—which were merged with Texas Gas in 1948.

He was introduced to the natural gas industry in 1926 when he joined the Kansas City office of Arthur Andersen & Co., public accountants, to specialize in gas utilities.

In 1928 he was assigned to do work for Kentucky Natural and the next year joined the company as assistant treasurer and director. He is also president of Western Kentucky Gas Co.

Brooklyn Union Elects Green Chief Engineer

Samuel Green

Present officers of The Brooklyn Union Gas Co. were re-elected at the organization meeting of the board of directors on May 9.

Samuel Green, assistant chief engineer, was elected chief engineer of the company. Ansel B. Huyck, who has been vice-president and chief engineer, was re-elected vice-president.

Mr. Green has spent his entire career with Brooklyn Union in the engineering division of the company. He came with the company in 1912.

A. Dudley Harrison, formerly assistant to chief engineer, was named assistant chief engineer on May 14.

Mr. Harrison has been with Brooklyn Union since 1928. In 1945 he became assistant general superintendent of Greenpoint works. Subsequent positions included assistant engineer of manufacture, engineer of development and planning, engineer of manufacture, assistant to chief engineer.

Geo. S. Young Is Now President Of Columbia Gas System

George S. Young

George S. Young was elected president of The Columbia Gas System, Inc., by the utility's board of directors at the annual organization meeting on May 4.

At the same time, Stuart M. Crocker, president for the past seven years, was named to the newly created post of chairman of the board. He will continue as chief executive officer.

Mr. Young began his service with the System in 1930 as a junior engineer. He became vice-president and general manager of the Michigan Gas Transmission Corp., a one-time Columbia subsidiary, in 1936. He came to New York in 1942 as a vice-president of Columbia Engineering Corp., the system's service company. In 1945 he was elected a director of this company and in the six succeeding years has become director of the parent corporation, The Columbia Gas System, Inc., then vice-president in charge of operations in May 1949 and executive vice-president in November of the same year.

Mr. Young was born in Butler, Pa., and was graduated from the United States Naval Academy and Columbia University.

Columbia Announces Promotions

C. E. Loomis

Columbia Gas System directors elected three of their officers to top executive positions on May 23.

C. E. Loomis was elected vice-president of The Columbia Gas System, Inc. and the system's service company, Columbia Engineering Corp., moving from assistant vice-president of both companies.

E. D. Bivens, treasurer of both the

parent and the service subsidiary, resigned these posts to accept election as vice-president and director of the Charleston (W. Va.) group companies of the system.

The Charleston group boards advanced Oliver S. Hagerman from the presidency to chairman and elected John W. Partridge president.

Francis H. Crissman, formerly assistant treasurer of both Columbia Gas and Columbia Engineering, was elected treasurer of the parent company, while remaining as assistant treasurer of Columbia Engineering.

Mr. Loomis joined the Columbia Gas System as a statistician in one of its operating companies. On the engineering staff of Columbia Engineering for a number of years, he moved to New York in November 1945. He was named assistant vice-president of the parent corporation in May 1950.

Mr. Bivens was named treasurer and director of The Ohio Fuel Gas Co. in 1932 and in 1941 he became treasurer of Columbia Engineering Corp. and a director of the service company in 1945. Since 1947 he has also been treasurer of the parent corporation.

Mr. Crissman began as a bookkeeper in the Pittsburgh group in 1930, coming to New York in 1938. He did much of the work in integration proceedings before SEC that resulted in Columbia's becoming exclusively a natural gas utility. He was named assistant treasurer of Columbia Engineering in 1947 and assistant treasurer of Columbia Gas the following year.

E. P. Prezzano Leaves Con-Edison To Join New Rochelle Bank

E. P. Prezzano

Edward P. Prezzano, who was president of the Westchester Lighting, Yonkers Electric Light & Power, and Bronx Gas & Electric Cos., has left his position as vice-president of Consolidated Edison Co. of N. Y. in charge of its Westchester division.

Ralph T. Tyner Jr., president of New Rochelle Trust Co., announced that as of June 1 Mr. Prezzano had become chairman of the executive committee of that bank.

Mr. Prezzano has been a director of New Rochelle Trust since 1948. He also has been a trustee of the Eastchester Savings Bank in Mount Vernon for 17 years.

In his new position, Mr. Prezzano will specialize in public relations work in which he has had exhaustive experience since he went to Westchester Lighting in 1924.

He was elevated from secretary to vice-president in 1926, became vice-president of Yonkers Electric Light and Bronx Gas and Electric in 1932, and was elected president of all three companies in 1936. Consolidated Edison has absorbed all of these subsidiaries, the two Westchester firms only last winter at which time Mr. Prezzano was elected a vice-president of the parent company.

Mr. Prezzano has been affiliated with utilities since 1902. He started with Consolidated Gas (now Consolidated Edison) in 1904, after two years as a clerk with the Standard Gas Light Co. in New York. He stepped up through various positions, became branch manager in 1918, and assistant general commercial manager in 1922.

Since 1947 Mr. Prezzano has been a trustee of Consolidated Edison. He became a director of Westchester Lighting and Yonkers Electric Light in 1934, a member of Westchester Lighting's executive committee in 1936, and a director of Brooklyn Edison Co. in 1937.

Mr. Prezzano served twice as president of the Empire State Gas and Electric Association and is a member of the Society of Gas Lighting.

Howard M. Smith Is Dead

Howard M. Smith, who at the time of his retirement in February 1950, was vice-president and director of Iowa Public Service Co., Waterloo, Iowa, died on March 26 in San Antonio, Texas.

Mr. Smith was a former president of Midwest Gas Ass'n, and of Iowa Utilities Ass'n.

THE PROOF'S ON RECORD

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Paul E. Peacock, Jr., Starts LP Consulting Service

Paul E. Peacock, Jr.

Paul E. Peacock, Jr., has resigned from H. Emerson Thomas & Associates, and has established his own LP-gas engineering and contracting business at Westfield, N. J.

By special agreement with Mr. Thomas, Mr. Peacock for four months will assist the company on design and operation of about 50 plants he designed. Mr. Peacock is also helping in the completion of 12 plants which were started when he was with Mr. Thomas' firm. He will do this on a part time basis.

Rockwell Manufacturing Makes Sales Force Changes

A. J. Kerr, vice-president of sales, meter and valve division, Rockwell Manufacturing Co., Pittsburgh, Pa., has announced several personnel changes in the company's sales force. These changes are predicated on strengthening the over-all sales organization.

E. E. Matheson will move to the Oakland, California, plant, where he will assist the factory management by acting as liaison between production, engineering and sales.

H. Gottwald will become general sales manager for Nordstrom valves.

R. R. Bush will be oil field products sales manager.

O. W. Barnett will be sales manager of warehouse and jobber sales.

Mr. Kerr also announced the appointment of R. V. Burnette as service manager for the company's meter and valve division. His duties will consist of establishing repair procedures in factories and district warehouses.

N. Y. Companies Get Approval For New Transcontinental Link

The Federal Power Commission has authorized the construction by three New York companies of facilities which will provide an alternative means for the delivery of natural gas from Transcontinental Gas Pipe Line Corp. into the New York metropolitan area in the event of a break or stoppage in Transcontinental's line or in the mains of the New York companies.

The companies, Kings County Lighting Co., The Brooklyn Union Gas Co., and Consolidated Edison Co. of New York, will build facilities estimated to cost $698,000 which will interconnect with the terminus of the "Narrows Crossing" extension of Transcontinental's system on the east bank of the Narrows at the entrance of New York Harbor in Bay Ridge, Brooklyn.

W. G. Hamilton, Jr.

C. B. Dushane, Jr.

American Meter Elects Hamilton President; Dushane Vice-pres.

American Meter Company has announced the election of William G. Hamilton, Jr., as president of the company. John C. Diehl, who was president since Aug. 1950, was elected chairman of the board.

Mr. Hamilton was first employed by Helme and McIlhenny, a subsidiary of the American Meter, after attending Swarthmore College. In 1932, he was made sales engineer in Philadelphia. In 1938 he was made assistant manager of the Philadelphia plant, becoming acting manager during the war. Under his management, the Philadelphia plant was awarded the Army-Navy "E" award. He was appointed manager of the Philadelphia factory in 1946, and in 1947 became vice-president in charge of sales.

C. BENSON DUSHANE, JR.

C. Benson Dushane, Jr. was elected vice-president in charge of sales.

Mr. Dushane attended Massachusetts Institute of Technology and Johns Hopkins University. He engaged in sales work, joining the sales department of American Meter in 1920. Prior to his election as vice-president, he was manager of the mid-west sales division.

Mr. Dushane is President of the Keokuk Gas Service Co., Keokuk, Iowa, a director of the Wisconsin Fuel and Light Co., Manitowoc, Wisc., and of United Cities Utilities Co., Chicago.

W. B. ASHBY

American Meter also announced the election of W. B. Ashby as secretary.

Mr. Ashby attended Georgia Institute of Technology, and joined American Meter sales engineering staff in 1940. In 1947, Mr. Ashby operated the company's Orlando, Florida, meter repair shop, and in 1948 he conducted a survey of LP gas operations in South America for the company. He was made assistant to the vice-president in charge of sales in 1948.

Southern Gas Ass'n Has Its Biggest Convention

Newly elected officers of Southern Gas Association: (Left to right) Kyle Turner, Atlanta Gas Light Co., assistant secretary; H. V. McConkey, Southern Union Gas Co., treasurer; H. K. Griffin, Mississippi Gas Co., second vice-president; L. L. Dyer, Lone Star Gas Co., president; J. H. Wimberly, Houston Natural Gas Corp., first vice-president; C. H. Zachry, Southern Union Gas Co., vice-chairman, Advisory Council.

The Southern Gas Association's biggest convention in history came to a successful close at Biloxi, Miss., on April 25 with the election of Lyman L. Dyer, of Lone Star Gas Co., Dallas, as 1951-52 president. More than 1,300 delegates attended.

Retiring president Carl H. Horne laid down a program for SGA members to consider during the coming year.

1. *SGA-AGA Relations.* "I think it is well that the SGA study its relationship with AGA in order to further the interest of its members. The greatest benefits to the membership common to both of these associations can be had if each formulates its programs to be constructively complementary to each other. I take the view that SGA should do two things about this.

"First, it must make its voices heard in AGA councils and it must say that which truly reflects the opinion of its membership. SGA should use its conference mechanism to determine what it would like to have AGA do and then see to it that SGA takes an active part in AGA committees.

"Second, SGA through its members must assume its full obligation to carry out AGA activities and promotional programs at the local level."

Gulf-Michigan Seeks Authority For Louisiana-Indiana Line

Gulf-Michigan Gas Transmission Corp., of St. Louis, has applied to the Federal Power Commission for authority to construct a 680-mile Louisiana-to-Indiana natural gas pipe line for service to Michigan-Wisconsin Pipe Line Co., with a lateral to the St. Louis area.

The proposed project, estimated to cost $85,000,000, would initially transport 350 million cu. ft. of natural gas daily from southern delivery points of supply to northern markets, the application states. The company plans to deliver 200 million cu. ft. daily to Michigan-Wisconsin, with the remaining 150 million cu. ft. going to the St. Louis area.

The main 680-mile, 30-inch line would extend from Perryville, La., to St. John, Ind., where it would connect with Michigan-Wisconsin's facilities. The St. Louis lateral would extend from a point near Belleville, Ill., for approximately 25 miles to the east bank of the Mississippi River opposite St. Louis. The system would be powered by three compressor stations of approximately 30,800 total hp.

Servel Gives New Assignments To Hadley, Noll and Clarke

New assignments for three district sales managers have been announced by John K. Knighton, general sales manager of Servel, Inc.

Leonard W. Hadley, district sales manager at Kansas City, has been appointed manager of Servel's Evansville sales branch.

Michael P. Noll, formerly district manager at New Orleans, now becomes Kansas City district manager. He is succeeded by Robert R. Clarke, formerly district sales manager in Detroit.

Anderson Is Petroleum Engineer For Blaw-Knox at Tulsa

Kenneth W. Anderson has been appointed petroleum engineer of Blaw-Knox Company's Tulsa office.

Mr. Anderson was graduated from the University of Tulsa in 1938 with a degree in petroleum engineering and has had 12 years' experience in the design and operation of refinery and gasoline plants. He has also worked on special direct-fired furnace designs for the petroleum and natural gas industries.

J. G. Dierkes Elected President Of Incineration Div., Bowser, Inc.

J. G. Dierkes, formerly general manager of Bowser, Inc., Incineration Division, Cairo, Ill., was elected President of the division, and Willis D. Lafoon was made secretary and treasurer at the annual meeting of Bowser, Inc., the parent company, at Fort Wayne, Ind. on April 24.

According to R. Hosken Damon, chairman of the board, the action is recognition of the outstanding job that has been done by Mr. Dierkes in the production and promotion of the automatic gas-fired "Incinor" which was announced late last year. It was revealed that the Incineration Division had a substantial increase in sales in 1950 with the first quarter of 1951 about 50 per cent ahead of last year.

Robert B. Grove Retires; Was V-P, Consol. Edison

Robert B. Grove, vice-president of Consolidated Edison Co. of New York, retired from active service on May 1 after 44 years with the company.

He was recognized for nearly 30 years as an authority on electric and gas rate policies of public utilities and was widely known as an expert witness on rate matters before the New York State Public Service Commission.

In the years immediately preceding the Con Edison mergers, Mr. Grove held vice-presidencies and directorships in several of the New York electric companies. With the creation of the Con Edison system in 1936, he became vice-president in charge of rates, legal matters, commercial relations, commercial buildings and property protection and supervised the Edison Savings and Loan Association.

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Iron Sponge offers extremely high activity with maximum absorption. Periods between regeneration are longer while the regeneration itself is accomplished quickly and simply.

For low or high pressure purification problems, Iron Sponge is *still* the most economical solution.

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United Natural Seeks to Build Facilities in Pennsylvania

United Natural Gas Co., of Oil City, Pa., has asked the Federal Power Commission for authority to construct additional natural gas transportation facilities on its system in northwestern Pennsylvania in order to increase its ability to safely supply the demands of customers.

United is proposing to construct over 10 miles of new lines in Elk, McKean, and Vengango Counties, and to replace more than eight miles of line in those counties.

Estimated total capital cost of the project is $745,500.

Commonwealth Reports Progress In Virginia Conversion

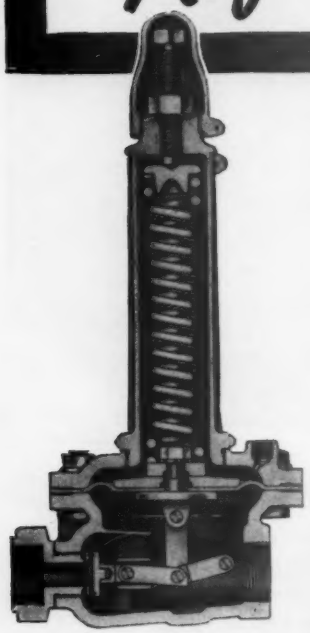
Commonwealth Natural Gas Corp. has completed construction of its system and is now delivering gas to all of its utility customers, except Suffolk Gas Co., where changeover commenced early in April. Deliveries to the Virginia Electric & Power Co. commenced at Newport News on March 16 and will commence at the second delivery point in Norfolk as soon as that company has completed its tie-in line.

Changeover to the delivery of straight natural gas has been completed in Richmond and by the Petersburg and Hopewell Gas Co.

IN THE HIGH PRESSURE FIELD

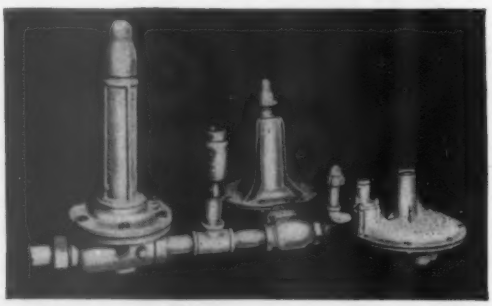
THERE IS SAFETY

IN *Reynolds...*



Accurate, Safe Control

of tremendous pressures is an ever present problem in the gas field. Reynolds field Regulator illustrated at left is one of the many high pressure regulators built by Reynolds. It is thoroughly tested and proved in service. It handles up to 1,000 pounds safely reducing same to pounds. For more than fifty-five years Reynolds has designed and built gas regulators. Safety, accurate performance, years of service—these are some of the built-in factors responsible for Reynolds enviable position in the Gas Control Field.



Reynolds Gas Regulator Co.

ANDERSON, INDIANA, U. S. A.

GAS CONTROL SINCE 1892

A. W. Lundstrum Elected V-P Of Ohio Fuel Gas Co.

Allan W. Lundstrum has been elected vice-president and general manager of Ohio Fuel Gas Co., at Columbus, to succeed William N. Grinstead, who has been promoted to the presidency of the company, which is a Columbia Gas System subsidiary.

Former president E. C. Overbeck has been advanced to chairman of the board of the utility.

Mr. Lundstrum, who also becomes a director of the company, has spent most of his business career in the service of the gas industry. Prior to 1942 he was with Electric Bond and Share properties, and with Ebasco Services. From 1942 to 1945 he served under Paul Taylor on the War Production Board. His recent position was with Stewart Warner Corp., Indianapolis, where, in company with H. W. Milner, he was engaged in the development and sales of the company's heating appliances.

The Lundstrum vent, a unique device designed to eliminate the need for vent stacks on domestic appliances by expelling combustion products through the side walls of a house, is being promoted by Stewart Warner on their room-heater "safety sealed" gas heating units.

Atlantic Seaboard Plans Compressor Station

Atlantic Seaboard Corporation, of Charleston, W. Va., has applied to the Federal Power Commission for authority to construct a 3,520-horsepower compressor station in Randolph County, W. Va., on its Cobb-Rockville 26-inch line to provide additional capacity sufficient to meet the 1951-52 peak day and winter volumes of its present customers.

The proposed new station would contain four 880-horsepower gas engine driven compressor units.

Natural Gas Pipe Lines

(Continued from page 15)

nevertheless familiar so the processor knows what he has to work with. By its very nature it enables continuous-flow procedures for manufacturing chemicals. Because it is gaseous its usage does not require storage tanks, etc. It is clean, laborless, and economically inexpensive. Its chemical future is great.

The ingenuity and imaginative zeal of today's chemical progress is fascinating to the layman. It is a real tribute to the foresighted managerial skills of the oil and chemical industries which devote such impressive millions of dollars to scientific researches. The panorama is a fast changing one in which this lay observer can see and attempt to describe only in simplified outlines. In fact, the technology is so complex and ramified that an article of this sort must be only a "bird's eye view" of a great industrial development.

AGA Announces Air Conditioning Progress Contest

Announcement has been made by the American Gas Association of the fourth annual progress award for gas summer air conditioning for the gas utility companies that have made the most outstanding contributions in 1950-1951 to the advancement of gas summer air conditioning. In addition, individual recognition will be given to members of the winning utilities who had a part in the accomplishments. The awards are sponsored by Servel, Inc., and consist of cash prizes and a trophy.

In the current competition, awards of $500, $300 and $200 respectively will be made to companies winning first, second and third prizes. In previous years a single award was made.

Entries may be based on any of the many activities relating to the sale or installation of gas summer air conditioning. Only activities recorded during the period August 31, 1950 to August 31, 1951 will be considered.

Entries must be addressed to H. W. Doering, chairman, AGA Gas Summer Air Conditioning Committee, American Gas Association, 420 Lexington Avenue, New York 17, and must be submitted on or before September 15. The winning company will be selected by a jury of awards comprised of a member from each of the following fields of industry and science: American Society of Heating and Ventilating Engineers; the educational field; gas trade publishers; American Institute of Architects; the building industry press; Gas Appliance Manufacturers Association; American Gas Association Laboratories; and a representative of the Residential Gas Section of AGA.

The awards will be presented at the annual AGA convention at St. Louis, Missouri, October 15-17.

John E. Canfield Elected Prexy Of Utility Advertising Ass'n

John E. Canfield, public information director of Wisconsin Power and Light Co., was elected president of the Public Utilities Advertising Association on May 18 at the Association's 30th annual convention at the Hotel New Yorker. Mr. Canfield succeeds William B. Hewson, assistant vice-president of Brooklyn Union Gas Co.

Other new officers are: First vice-president—Paul L. Penfield, Detroit Edison Co.; second vice-president—Walter G. Heren, Union Electric Co. of Missouri; third vice-president—C. Fred Westin, Public Service Electric and Gas Co. of New Jersey; secretary—George G. Hanel, Connecticut Light and Power Co.; treasurer—Mead Schenck, Interstate Power Co. of Dubuque, Iowa.

A feature of the convention was announcement of 143 winners of the 1951 Better Copy Contest. This is the contest's 28th straight year, said to be a record for competition in the advertising profession. Entries were judged in 22 classes which included virtually every media of advertising and public information.

Among the speakers at the convention were L. V. Sutton, president of the Edison Electric Institute, and D. A. Hulcy, president of American Gas Association, the U. S. Chamber of Commerce and of the Lone Star Gas Co., Dallas.

Because the continuing attack on the public industry is often "carried on the backs of innuendo and half-truths," the industry has some simple but effective weapons of defense, Mr. Sutton said. The first, he said, is the efficient and honorable operation of a sound and vital industry; the other is telling its story truthfully in effective and hard-hitting and convincing terms.

Mr. Hulcy called upon the public utility executives present to keep rival gas and electric advertising "competitive but clean." He said that appliance advertising is cleaner today than it ever has been but he thought it still could be improved.

Denny Griswold, publisher of *Public Relations News,* said that public utilities were often to be commended for their industrial and stockholder relations but were poor in their press relations. Tom P. Walker, vice-president, Irving Trust Co. of New York, spoke of the necessary cultivating of good relations with stockholders.

A PIG for SAVING MONEY

VULCAN Diaphragms in gas meters save money four ways:

1. They cut down on costly man hours of service because they help insure meter accuracy.
2. They virtually abolish tie leaks and consequent repairs and replacements. They do not dry out and become brittle.
3. They save the cost of labor and materials for oiling . . . save expensive shop space.
4. They are easier to install. No danger of spoilage due to scorching.

For long, faithful service without attention, turn to VULCAN Diaphragms—for meters, governors and controls.

VULCAN RUBBER PRODUCTS, INC.

FIRST AVENUE & 58th STREET • BROOKLYN 20, N. Y.

Pacific Coast Representative: GORDON Z. GREENE CO., 2335 E. 8th St., Los Angeles 21, Calif.

Natural Gas Comes of Age

(Continued from page 19)

sions are approaching the problem in a manner which provides fair and equitable treatment to both the customer and the common stockholder. Other commissions, however, seem concerned mainly with the problem of keeping rates as low as possible with what I term little regard for the future of the industry.

In the minds of many people there is obviously confusion as to the true earnings status of utility companies. In fact, this confusion is not limited to utility earnings but applies to the earnings of all corporations. You hear, all too frequently: "that company earned 100 million dollars this year as compared to 70 million dollars last year. It's too much!" Such critics fail to relate these increases in dollar earnings to increases in sales, which in turn have required increased investments in plant and inventory. Also, when considering the earnings of corporations, such critics think in terms of dollars. They don't think in terms of the purchasing power of those dollars. I do not know why such confusion should exist because certainly for all other purposes everyone is complaining today of the increased cost of living.

Regulation should recognize the rights of common stock investors. Stockholders are not a class apart—for the most part they are individuals. And regulation must recognize the effect of the depreciation of currency on the purchasing power of earnings from common stock investments.

Certainly no one today holds out any hope that the purchasing power of the dollar will soon be restored to its 1940 level. In fact, it appears that the downward trend may continue. This condition is recognized by labor, which has frequently received wage adjustments to offset the increased cost of living. Why not give similar treatment to the common stockholder of a utility? For the dollars which he invested last year or 10, 15, or 20 years ago, is it fair that he should receive a return which does not recognize the depreciation in the value of the dollars he now receives?

Let us for a moment consider the peculiar position of a natural gas utility. It is sometimes referred to as a legalized monopoly; but just what does that mean? It certainly does not mean that it is free of competition. True, it does not ordinarily compete directly with other natural gas companies; but it does compete with electric utilities and with oil and coal. Regulation does not insure the natural gas utility against loss from this competition nor does it guarantee that earnings will remain at proper levels during times of depression. The common stock of a bankrupt natural gas utility can be just as worthless as the common stock of any other bankrupt.

I am not suggesting that any such thing is in the offing. On the contrary, the natural gas industry today is in the soundest financial position of its history and its present ability to raise new capital has, in my opinion, never been exceeded by any industry. My plea is that now is the time to improve regulatory procedures and laws so as to keep its financial condition sound. This is especially necessary because, as I mentioned earlier, utility companies are not able to finance any substantial part of their growth from retained earnings but must do so through the sale of additional securities. A sound financial condition and proper earnings are necessary if the utility companies are to attract the required new capital.

The Independent Producer

You will recall the great difference in house heating costs for the three basic fuels. When a fuel having operating advantages over competing fuels sells at a much lesser cost than those competing fuels, the reasons must be closely examined. To the extent that it is due to inherent advantages, and I am referring to its transportation and utilization advantages, the cost difference may be justified. However, when it is not due to these causes, that is another story. First, I believe the rates charged for natural gas should rise as certain of the regulatory commissions adopt a more equitable theory of rate making. Secondly, I believe that as a general premise the value of natural gas at the well should go higher so that it will sell more in relation to the field value of competing fuels.

Again, I do not believe that producers are a special class of people who are not affected by the decreasing value of the dollar. Certainly the cost of drilling and of operating and maintaining wells has increased and the dollars received by independent producers for their gas will buy no more than the dollars received by anyone else. This question of the decreasing purchasing power of our currency affects everyone and recognition of that fact should not be given to labor or any other class alone.

If natural gas field prices are increased and the earnings of the natural gas utilities are permitted to rise, then retail prices of natural gas must be increased. This would obviously lessen some of the present demand; but I believe that, from a long-range viewpoint, it would be much better for the natural gas companies and the natural gas producers if these demands were lessened.

With the present price situation, we are finding it impossible to keep demands under control and I, for one, would rather see a lessening in demand with a

PREPARE FOR NATURAL GAS

SEALALL —*Joint Sealing*
WETALL —*Dust Laying*
FOGALL H —*Hot Fogging*
FOGALL C —*Cold Fogging*
FLUSHALL —*Dust Removal*
SOLVALL —*Liquid Phase Gum*

A COMPLETE MAIN TREATMENT SERVICE

Discuss your problems with our engineers

GAS PURIFYING MATERIALS COMPANY INC.
3-15 26th Ave., Long Island City, N. Y.

consequent improvement in the long-range picture of natural gas. Certainly that would be better than this present orgy of tremendous expansion in the use of one of our great national resources without due regard for its true economic value.

In addition to the long-range picture something must be done to take care of the immediate situation. I imagine that all of the distributors in the Appalachian area have had experiences somewhat similar to ours. Since the additional requirements for gas in the Appalachian area must be taken care of by bringing in gas from the southwest, the requirements must be anticipated months and even years ahead. From the standpoint of the transportation company, gas supplies and reserves must be secured, the approval of regulatory commissions must be obtained, and the additional facilities must be engineered, financed and constructed. On the part of the Appalachian companies, gas storage facilities must be provided and additional facilities, both transmission and distribution, must be constructed. Certainly demands must be foreseen far in advance and new demands which arise cannot be taken care of on short notice. Delays in the consummation of the plans can also upset our calculations entirely and our experience this past winter illustrates these facts. Due to weather and other conditions, some of our southwest suppliers were unable to deliver additional gas on schedule. House heating installations were much heavier than had been anticipated, so much so that by the middle of last summer we were obliged again to place restrictions on these installations. Stepped-up industrial activity and the resulting substantial increase in requirements of gas for industrial use intensified the severity of the problem. Added to these things was unusually severe weather, and, as a result, on several occasions this past winter, it was necessary for us to make sharp curtailments in industrial deliveries and at times we were hard pressed to meet domestic requirements.

Unless we receive large additional supplies of gas, we cannot expect the situation to improve in the near future because, in spite of restrictions, demands will continue to increase. What the situation will be with respect to materials we do not know; but, unless the necessary pipe and other materials are obtained and additional supplies of gas are brought into the Appalachian area before next winter, the situation from the standpoint of peak day deliveries may be serious.

I have attempted to give you a somewhat over-all picture of the industry and its problems. Let me now summarize:

I believe the Appalachian area will continue to rank as the leading domestic gas consuming area of the nation. This area is the industrial center of the United States. Because of the diversity of its industries, its economics are sound. In addition, because of its facilities for the underground storage of gas, it will not be necessary in the Appalachian area to resort to the sale of natural gas for boiler fuel to permit the utilization of southwest pipe lines at near capacity the year round. Domestic sales will predominate and industrial sales will in general be made, not on an off-peak basis, but on an interruptible basis which contemplates possible curtailment on only those few days when domestic demands are at a peak.

For the future well-being of our industry and its customers, additional load should come on in an orderly manner. Our big problem is to control the increasing demand for natural gas in the face of the considerable price differential which exists. In a non-regulated industry the economic law of supply and demand would normally take care of such a situation. When the supply was not sufficient to meet the demand, it would operate to control the demand by increasing prices. But that economic law does not apply to a regulated business and we must have the firm support of regulatory bodies to place such artificial restrictions on demands as may be necessary.

As to the Appalachian producer, he continues to play a very important part in the Appalachian picture. Recent discoveries in the Appalachian area have opened up a considerable amount of acreage for future exploration and geologists believe that many new and important discoveries of gas will be made in this area. In the future the independent producers and the utility companies may possibly be able, subject to legal restrictions, to work out better methods of utilizing Appalachian gas in such manner as to obtain the maximum long-range benefits therefrom. Obviously, because of differences in interest, this will present its problems; but I believe that they are problems which can be solved.

At the moment, the Appalachian natural gas industry has a grave responsibility which must be shared by the independent Appalachian producers. Industrial fuel requirements in the area are growing as the country's defense effort gains momentum. These requirements must be met at a time when increasing domestic demands are bringing about a critical natural gas supply situation in the area. Even though additional southwest supplies are obtained, that alone will not solve the problem. More gas must be obtained from the Appalachian area and we in Columbia would welcome increased interest in drilling by independent producers.

The cost and hazards of exploratory

No Service Problem!

No Costly Installation!

No Combustion Hazards!

WHEN YOU SELL STEWART-WARNER'S

Safety-Sealed

GAS HEATING UNITS

(Above) Model 991-20 — 18" x 38½"

Easy to install . . . no chimney, no ducts, no electricity required. Easier to maintain with no moving parts to wear out or replace. These new "Safety-Sealed" units bring clean, *zone controlled* automatic gas heat to a room, suite or an entire building. Give dealers "extra" equipment flexibility for hundreds of heating needs.

Exclusive, revolutionary "Safety-Sealed" construction seals all combustion air and products from contact with heated room air. Expels all combustion products *outside* — through the wall.

Operation is silent, dependable — with either natural, manufactured or LP gas. Individual requirements are suited *exactly* from manual or thermostatic controls.

WRITE NOW for complete, free information and specifications. Stewart-Warner Corp., South Wind Division, Dept. C-61, 1514 Drover Street, Indianapolis 7, Indiana.

STEWART Safety Sealed WARNER

DOMESTIC HEATING

Approved by American Gas Association

drilling are themselves sufficient barriers without erecting additional ones. Some of the current talk concerning the reduction of depletion allowance for Federal tax purposes certainly falls in that category and those who advocate it might well investigate the possible results of any such action.

I believe that the price situation requires some adjustment. Retail gas prices should be increased in order to bring them more in line with competitive fuel prices. I am of the opinion that such an increase is justified because I believe utility earnings should be higher. Also, that field prices should rise to bring them into line with competitive fuel prices in the field. If this can be accomplished, it should be done over a period of time and any increase in field prices must be synchronized with increased retail prices. Since the latter requires action by regulatory commissions, it is bound to be a slow and gradual process.

What I have said about field prices applies not only to Appalachian gas, but also to southwest gas; but I believe that the demand for gas there is tending to cure the situation in the southwest. Certainly indications are that southwest field prices are moving higher and will find their proper economic level.

There is another problem which I believe is real and must be met. The nation is faced with a serious fuel shortage because of the heavy demands of the Armed Forces and of industry and because sufficient materials required for construction may not be available. The petroleum industry cannot solve this fuel problem alone. Oil can be transported overseas and therefore, it alone must be responsible for the increasing fuel requirements of our Armed Forces. But, here on the home front, natural gas can play its part in the defense effort both in the factories and homes of America. I have not mentioned the coal industry and I am not attempting to minimize the part that it will play. I have considered only the petroleum and natural gas industries because even though those industries and their problems are different in many respects, they do have some common interests and problems which can be solved better jointly than individually. Certainly both industries must work together so that available materials are used to the greatest possible advantage.

We in Columbia would like to stabilize our volume of business at its present level until the many present uncertainties are cleared up, but obviously this cannot be done. The demands for fuel are increasing and must be met. Keeping in mind the present emergency and the conservation of critical materials, if fuel demands can be best met with natural gas, permission must be granted to construct the necessary facilities. If they can be best met with oil, or for that matter with coal, then the natural gas facilities should not now be constructed.

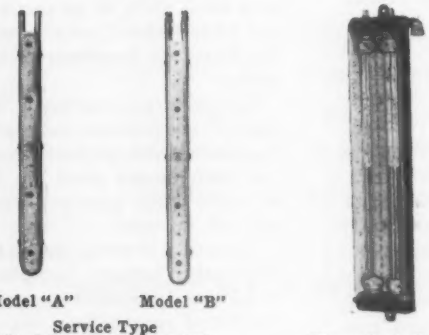
Some decisions may be required which will be unpopular with customers. I know that in our own service area, restrictions on the sale of gas for house heating are extremely unpopular and to be effective must be backed by appropriate government regulations.

The opinions I have expressed certainly concern problems which are always subject to differing opinions; but one thing I am sure of—the natural gas industry has come of age and is entitled to the respect due an adult member of the family.

While it can be proud of its achievements of the past few years and the manner in which it faced and solved its problems, there are more and bigger problems to be solved in the years ahead. Yet I am confident that if we, in the management of the natural gas industry, cooperate with each other and all play our part, these problems will be solved for the mutual good of our millions of customers, our tens of thousands of employees and our hundreds of thousands of security holders.

NORWALK MANOMETERS

For Water, Mercury, Oil or Glycerine



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Heavy Duty Type

For pressure or vacuum use. Made in all sizes and types. Service Type has unbreakable tubing and will stand abuse. Send for bulletin 3100M for complete data and prices.

NORWALK VALVE COMPANY

South Norwalk, Conn.

Manufacturers of Norwalk-Connelly Regulators since 1878

LOWEST COST PIPE INSTALLATION...

2" to 24" BORES · Up to 250' long.

Send COUPON Today!

Hydrauger Corp., Ltd.
681 Market St., San Francisco, Calif.
Please send, without obligation to me, the HYDRAUGER BOOKLET which shows relative costs and speeds of BORING as well as specifications of various Hydrauger models.

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ADDRESS _____

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HYDRAUGER* Reg. U. S. Pat. Office

UNDER STREETS
UNDER FREEWAYS
UNDER GARDENS
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OPEN HOLE

HY-25A

AVOIDS EXCESSIVE TRENCHING

Hydrauger bored holes for pipe installation invariably reduce costs 80% to 90% by eliminating trenching and back-filling to say nothing of man-hour labor savings and safety to highway traffic.

HYDRAUGER CORP. Ltd.
681 Market Street
San Francisco, California

*Earth Boring Tool

Flash Tube Ignition

(Continued from page 26)

the thermal element cools. In this event, the standby pilot is available to re-ignite the burner immediately instead of unburned gas escaping from the oven burner before the oven valve automatically steps in to shut off the burner. This feature is also of value in connection with sales floor demonstrations.

Schematic diagrams of this new automatic valve showing the various stages of operation are shown in Fig. 5—A, B, C and D. The valves as manufactured by the various maufacturers are different in appearance and different methods are used for actuating the valves. However, the functions performed are similar.

The valve described above is similar to the type currently being used on the 800 test ranges that are being equipped with flash tube ignition in connection with the AGA automatic range ignition test program now underway.

It might appear to some that the first system mentioned, namely, the one-bend —two step system, would have the greatest operating flexibility and it is quite possible that this may prove to be the case after more experience is gained in the field. However, noteworthy tests have been made with the second system (two bend—single step flash tube). In these tests 1040 Btu straight natural gas and 525 Btu manufactured gas were used separately in two different test runs without making a single change in adjustment and in which the orifice size remained the same. Flashing was successful and reliable on both gases with the oven at room temperature and at 500° and under the prescribed AGA pressure range.

A similar test was performed at the AGA Laboratory by Mr. Knobloch of The Philadelphia Gas Works Co. before the Sub-committee on Approval Requirements for Domestic Gas Ranges on January 20 and 21, 1948. Data on this particular test are tabulated below:

I.D. of tube	.62"
Width of the slot	.058"
Vertical distances between top pilot & oven charge port	22"
Horizontal distances between top pilot & oven charge port	10"

Analysis of Manufactured Gas		Analysis of Natural Gas	
H_2	51.0%	CH_4	87.0%
CO	15.7	C_2H_6	9.4
CH_4	21.6	C_3H_8	.6
C_2H_6	4.25	N_2	1.4
C_3H_8	.3	CO_2	1.0
CO_2	1.2	O_2	.6
N_2	5.95		
	100.0%		100.0%
Btu—525	Sp. gr. .40	Btu—1040	Sp. gr. .61

Conclusions

The title of the editorial which appeared in the February 1951 issue of AMERICAN GAS JOURNAL, namely, "Keep Gas Ranges Gas," does an excellent job of summing up this entire subject.

Since the top burner pilot is accepted without question by customers everywhere, there does not seem to be any justification from the standpoint of revenue derived for passing up this valuable pilot load, which has a 100 per cent load factor, to our most serious competitor, as would happen in the case of electric ignition.

All Advantages of Electric Ingnition; None of Disadvantages

Flash tube ignition, from the standpoint of selling gas ranges in the face of present-day competition, should be one of the most outstanding advantages of using gas for cooking along with the many other natural advantages of gas as a cooking fuel. Technically, the way is open for the advancement of flash tube ignition. In the last analysis, from the competitive standpoint it possesses all the possible advantages of electric ignition with none of the disadvantages.

CONVERSION SPECIALISTS:

- The most economical, trouble-free system conversions are those entrusted to specialists with experienced crews and tested routines for getting the job done right and done quickly.
- *Our trained and experienced crews* are ready for immediate service in any section of the country, to convert systems from manufactured gas to either natural gas or HiBtu oil gas.

Gas Construction & Service Co., Inc.

Worth 2-5120 30 Vesey Street New York 7, N. Y.

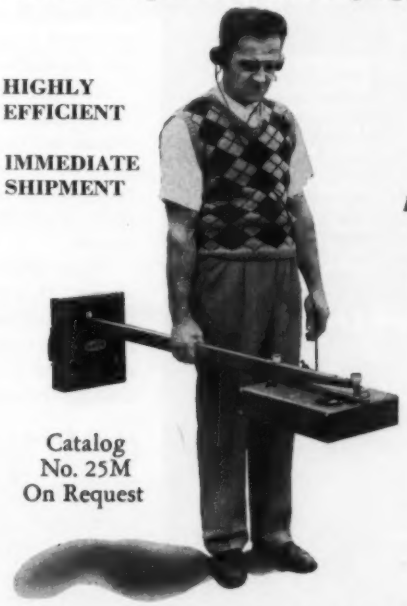
M-SCOPE Pipe Finder

LIGHTWEIGHT MODEL

One Man Operation On Every Application

HIGHLY EFFICIENT

IMMEDIATE SHIPMENT



Free Demonstration and Operating Instructions

Catalog No. 25M On Request

JOSEPH G. POLLARD CO., INC.

Pipe Line Equipment

New Hyde Park **New York**

Appliance Sales Contracts

(Continued from page 32)

of the contract. If it was July 2, the 60 days was to have been commenced would have expired not later than August 31. However, the effective date was the date when the contract was approved by defendant (corporation) to wit, August 2."

Impossible to Deliver

According to a late higher court decision a gas corporation cannot avoid being liable on a contract for failure to deliver the subject of a sale on the date specified in the contract.

For example, in Appliances v. Queen, 36 N. W. (2d) 121, a seller's inability to procure sufficient material to complete a contract on time did not excuse him from paying damages to the purchaser.

Also, this court held that the building owner was entitled to damages for the contractor's breach of the contract equal to the difference between the contract price and the price at which another re liable contractor will complete the job.

And also a gas corporation cannot avoid liability of failure to fulfill the exact terms of a contract, on an excuse that he made an error in figuring the price.

For illustration, in Harris v. Lillis Co., 24 So. (2d) 689, the testimony showed that a company made a written offer to furnish and install gas equipment in a residence for an agreed sum of $300. The company refused to do the job claiming that it had made a "big error" when submitting the $300 bid. The building owner then had the work performed by another company for $662.

The higher court rendered a verdict of $357.00 in favor of the building owner and said that a company cannot avoid liability for failure to perform a contract on the ground of mistake. The court held the company liable to the property owner for the difference between its erroneous bid and the amount paid the second company.

Still another important point of law is that a purchaser need not account to a gas corporation or other seller for equipment installed contradictory to the terms of the contract.

For example, in Bordonaro v. Vanden Co., 76 N. E. (2d) 755, it was shown that a company installed four stokers in four buildings for which the property owner agreed to pay $1,187. Of this amount $620 was paid in cash and the balance $567 was to be paid over a period of 12 months. The property owner made payments in accordance with the contract for a few weeks when he discovered that the stokers did not comply with the guarantee made by the company. Then the latter filed suit for the balance due and proved that the property owner had removed two of the stokers from two buildings without giving any information as to their present location. The company's counsel contended that this was an act illegal on the part of the property owner who must because of it pay the full balance due.

The higher court held that the act of the property owner removing the stokers which did not conform with the guarantee was not an illegal act, and the company could not collect the agreed payment since the stokers were not as guaranteed.

This court said that the testimony showed that two of the stokers were not the type called for in the contract, and hence the company violated its contract, giving the property owner the right to rescind the complete contract.

Must Prove Case

According to a recent higher court a dissatisfied purchaser of gas or other merchandise who sues the seller for damages, and rescission of the contract, must *prove* by disinterested witnesses that the subject of the sale was defective and not equal to the seller's guarantee. Otherwise the court will render a decision in favor of the seller.

For example, in Baker v. Smith, 46 So. (2d) 640, the testimony showed facts, as follows: One Baker purchased a refrigerator. After using the equipment several months Baker sued the seller and asked the court to award him damages and also asked the court to compel the seller to take back the equipment and refund the purchase price. Baker alleged that the temperature would vary from 40 degrees to 75 degrees which resulted in the equipment being unsatisfactory.

However, Baker *failed to prove* these alleged facts by disinterested witnesses. Therefore, the higher court held the seller not liable to Baker who must keep the equipment. The court said:

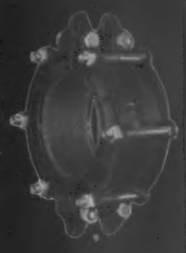
"The conclusion is easily reached that plaintiff (Baker) became dissatisfied and decided to recover the amount he had invested."

FOR REPAIRING BELL AND SPIGOT JOINT LEAKS...

SKINNER-SEAL Bell Joint Clamp for stopping bell and spigot joint leaks under pressure. Gasket is completely sealed: at bell face by Monel Metal Seal band — at spigot by hard vulcanized gasket tip.

AND BROKEN MAINS

SKINNER-SEAL Split Coupling Clamp. One man can install in 5 to 15 minutes. Gasket sealed by Monel band. Tested to 800 lbs. line pressure. A lasting repair. 2" to 16" incl.



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New Issue of Petroleum Facts And Figures Published

The ninth edition of *Petroleum Facts and Figures* is now being distributed. The book is one of the oil industry's authoritative compendiums on its vital statistics.

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Annual supplements will be issued for the 1951 edition for five years, after which a complete new edition will be made available.

Copies of the ninth edition may be obtained at $2.50 each by writing to American Petroleum Institute, 50 West 50th street, New York 20.

Vaporization of Liquid

(Continued from page 21)

fore can vaporize 271 gallons per hour without recourse to a vaporizer.

If this draw is maintained over a long period of time on a humid day, the surface of the tank in contact with the liquid will become frosted due to the refrigeration action of the liquid vaporized and the effective temperature differential will be substantially reduced. But in this discussion we are considering only comparatively short usages so as to obtain maximum vaporization.

Using the basic formula, graphs have been plotted which give available gallons per hour vaporized at various outside temperatures and pressure requirements of vapor and at varying filling heights in a 30,000 gallon (wc) tank containing commercial grade propane.

Referring to the graphs it is possible to decide when the vaporizer equipment will be required to obtain the necessary gas load.

Southern Natural Seeks FPC Approval to Expand

Southern Natural Gas Co., of Birmingham, has asked the Federal Power Commission for authority to construct pipe line facilities which would increase the daily delivery capacity of its natural gas transmission system from 555 million cu. ft. to 670 million cu. ft.

The proposed new facilities, estimated to cost $13,641,000, would be located in Alabama, Georgia, Mississippi and Louisiana, and would include three compressor stations with a total of 19,450 horsepower and approximately 169 miles of various size pipe lines.

The application says the facilities would provide additional capacity to meet increasing requirements of present markets, to supply newly-authorized markets, and to supply communities which the FPC has previously directed the company to serve.

The proposed new compressor stations would be located in Jefferson Davis and Clarke Counties, Miss., and Hale County, Ala. The pipe line construction proposed in the application includes a 20-mile supply line in Ouachita Parish, La.; 33 miles of triple loop line in Ouachita and West Carroll Parishes, La.; 7 miles of triple loop line in Sharkey County, Miss.; and 108 miles of 14-inch line extending through Georgia from Bass Junction to Augusta. The delivery capacity of the latter line, which would supply the Augusta, Ga.—Aiken, S. C. area would be 53 million cu. ft. per day, the application states.

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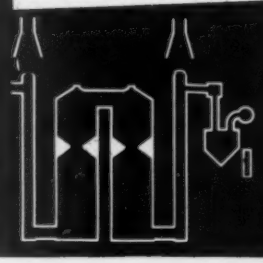

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CONVENTION CALENDAR

June

18-21 Canadian Gas Association, Bigwin, Lake of Bays, Ontario.

25-26 Michigan Gas Association, The Grand Hotel, Mackinac Island.

September

4-6 PCGA Convention, Fairmont Hotel, San Francisco.

October

15-17 AGA Annual Convention, St. Louis.

Washington Gas Light Plans For Standby Storage

Washington Gas Light Co., of Washington, D. C., has applied to the Federal Power Commission for authority to construct and operate a standby gas storage plant near Rockville, Md.

The proposed plant would have a delivery capacity of 100 million cu. ft. of gas, consisting of 70 million cu. ft. of natural gas stored under pressure in underground steel pipes and 30 million cu. ft. of propane-air gas. Estimated cost of constructing the plant is approximately $7,100,000.

The company said the proposed plant would supplement its present standby facilities in the event of failure of its supply of natural gas from Atlantic Seaboard Corp. The existing standby facilities, the application continues, are wholly inadequate, having a delivery capacity under emergency conditions of about 50 million cu. ft. per day for the first day of any emergency. Under present circumstances, if a pipe line failure occurred, the company said, that amount would last only a few hours on a day of peak demand.

The company plans to start the construction in July and to complete the job during the spring of 1952. However, the application says, it is expected that part of the storage facilities will be available for use on January 1, 1952.

H. Emerson Thomas & Associates Cited for European Aid

H. E. Thomas

William C. Foster, administrator of the Economic Cooperation Administration, has awarded a certificate of cooperation to H. Emerson Thomas and Associates, of Westfield, N. J. for assistance in giving technical aid to western European countries under the ECA program.

He stated: "I know of no better way to mark the third anniversary of the Marshall Plan than to give special recognition to those United States industries and other organizations who, by receiving individuals and groups on technical assistance missions from Western European countries, have become important partners in the effort to bring recovery and stability to Europe."

The administrator expressed the gratitude of his organization for the way in which H. Emerson Thomas and Associates cooperated to make the technical assistance program a success.

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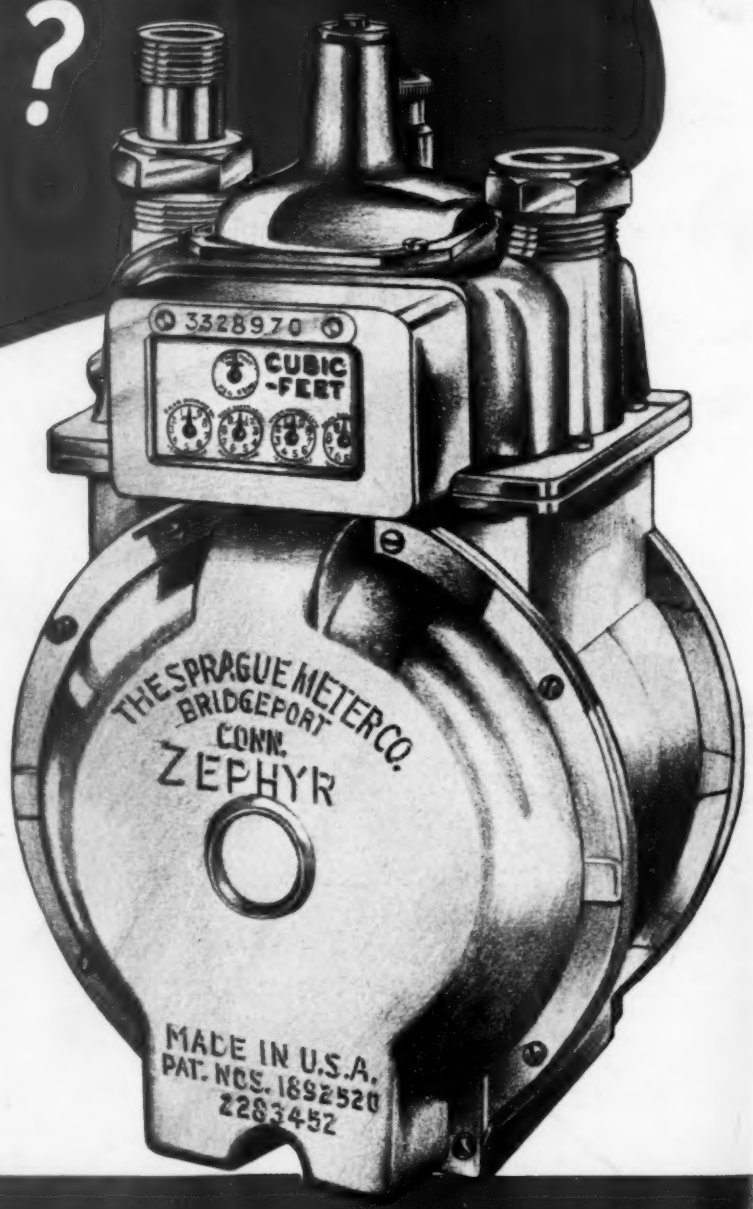

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